(28,719)

SUPREME COURT OF THE UNITED STATES.

OCTOBER TERM, 1922.

No. 273.

GEORGE E. VANDENBURGH, PETITIONER,

vs.

TRUSCON STEEL COMPANY.

ON WRIT OF CERTIORARI TO THE UNITED STATES CIRCUIT COURT OF APPEALS FOR THE SIXTH CIRCUIT.

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UNITED STATES OF AMERICA

Northern District of Ohio

Eastern Division.

Record of the proceedings of the District Court of the United States within and for the Eastern Division of the Northern District of Ohio, in the cause and matter hereinafter stated, the same being finally disposed of at a regular term of said court begun and held at the City of Cleveland, in said District, on the first Tuesday in October being the 5th day of said month in the year of our Lord One Thousand Nine Hundred and Twenty, and of the Independence of the United States of America, the One Hundred and forty-fifth to wit: on Monday the 18th day of October, A. D. 1920. Present: Honorable D. C. Westenhaver, United States District Judge.

George E. Vandenburgh)
vs.)
Turscon Steel Company, a corporation)

No. 500. Equity.

Said action was commenced on the 18th day of September, A. D. 1919, and proceeded to final disposition at the term and day above written, and during the progress thereof, pleadings and papers were filed, process was issued and returned and orderes

of the Court were made and entered in the order and on the dates hereinafter stated, to wit:

Complaint filed	Sept. 18, 1919
Answer filed	Oct. 1, 1919
Trial	June 8, 1920
Order dismissing bill entered	Oct. 18, 1920
Appeal petition filed	Nov. 5, 1920
Assignment of errors filed	Nov. 5, 1920
Order fixing bond entered	Nov. 6, 1920
Bond filed and citation issued	Dec. 2, 1920
Stipulation filed as to contents of record	Dec. 17, 1920
Stipulation filed under Sec. 7, Rule 44	Dec. 28, 1920

IN THE EASTERN DIVISION OF THE UNITED STATES DISTRICT COURT IN AND FOR THE NORTHERN DISTRICT OF THE STATE OF OHIO.

BILL OF COMPLAINT.
In Equity No. 500.

GEORGE E. VANDENBURGH,)
Complainant,)
vs.)
TRUSCON STEEL CO., a corporation,)
Defendant.)

BILL OF COMPLAINT IN EQUITY.

GEORGE E. VANDENBURG, a citizen of the United States, and a resident of the city and county of San Francisco, state of California, brings this his bill of complaint against the TRUSCON STEEL Company, a corporation duly organized and existing under the laws of the state of Ohio and having a place of business at Youngstown in the state of Ohio, and for cause of action alleges and avers:

1. That heretofore; to-wit, on and prior to May 9th, 1906 your orator was the original, first and sole inventor of a certain new and useful reinforcing bar particularly adapted for cement and concrete construction, more fully described in the reissue patent hereafter referred to and made a part hereof.

II. That said invention was new and useful, not known or used by others in this country, and not

patented or described in any printed publication in this or any foreign country before the invention thereof bysaid George E. Vandenburgh or more than two years prior to May, 1906, and not in public use or on sale in the United States for more than two years prior to May 9th, 1906, and not abandoned by your orator.

III. That your orator did, on the aforesaid ninth day of May 1906, duly and regularly make and file an application for patent on said invention in the United States Patent Office at Washington D. C. praying the grant to him of a patent for said invention.

IV. That thereafter upon due and regular proceedings had by the Patent Office in the matter of said Patent Application on the twenty second day of January 1907, letters patent number 841,741 were regularly granted and delivered by the United States Government to your orator, his heirs and assigns wherein and whereby there was secured to your orator his heirs and assigns for the full term of seventeen years from the 22nd day of January 1907, the sole and exclusive right to make, use and vend said invention throughout the United States of America and its territories.

V. That said letters patent were issued in due form of law under the seal of the Patent Office of the United States, and were duly signed by the Commissioner of Patents, or by his Assistant acting for him, and prior to the grant thereof all proceedings were had which were then required by the law to be taken prior to the grant of letters patent for new

and useful inventions, and were thereafter delivered to your orator.

VI. That thereafter it appeared to your orator that said letters patent were defective and insufficient by reason of the fact that your orator had claimed more than he had a right to claim as new, and by reason of the fact that the verbiage of the claims was defective in not precisely corresponding with the terms of the Specifications whereupon on, to-wit July 1st, 1916, being then sole owner of all right, title and interest in said patent, your orator prepared in accordance with law and filed an application with the Commissioner of Patents of the United States to have said Patent reissued; that thereafter due proceedings were had by the United States Patent Office, and in regular course said Patent was reissued and was delivered to your orator granting to him rights of the same effect and operation in law as if the same had been originally filed in such corrected form, and that the errors or mistakes in the original Patent arose by accident or inadvertence and without fraudulent or deceptive intention on the part of your orator.

VII. That said reissued letters patent were granted in due form of law under the seal of the United States Patent Office, and were signed by the Acting Commissioner of Patents, and bear date of August 15, 1916, under the number 14182, and that all requisite proceedings were had prior to the reissuance of said letters patent which are required by law in such cases, and profert is hereby made of said reissued letters patent, or a certified copy there-

of, for a more complete and full description of the invention covered thereby; and that your orator is now the sole owner of all right, title and interest in said reissued letters patent.

VIII. That said invention as protected by said patent and said reissue thereof, is of great and increasing value and utility and the public generally has acquiesced in the validity of said letters patent and the reissue thereof; that your orator has practised said invention and has marked his concrete reinforcement with the word "Patented" and with the dates of said patent and of said reissue patent; that your orator is desirous of preserving to himself all rights secured to him under said patent and the reissue thereof, that he has a regular and established license fee of 5% to 7½ per centum of the selling price of said reinforcing where he has permitted others to use said invention, and that the U. S. Circuit Court of Appeals at New York, N. Y. has finally decided said patent and reissue thereof to be valid and infringed in the case of Vandenburgh vs. Concrete Steel Co., April 16, 1919.

IX. That well knowing the premises and for the purpose of injuring and damaging your orator and without right or license from him, since the issuance of said letters patent, and since the reissuance thereof, within six years last past the above named defendant has made at Youngstown, Ohio and sold to divers persons and corporations concrete reinforcing containing and embodying the invention disclosed and claimed in the patent and reissued patent aforesaid that said reinforcing is now in use; that de-

fendant has made and sold several thousand tons of said concrete reinforcing for use in thousands of structures covering a large part of the country, a partial list of which structures is as follows:

Y. M. C. A. Building, Youngstown, Ohio (7 stories)

Ohio Hotel, Youngstown, Ohio (designed for 11 stories)

Hippodrome Theatre Building, Youngstown, Ohio.

Stearns Automobile Factory, Cleveland, Ohio.

Service Building for Ford Automobile Co., Columbus, Ohio.

Packard Motor Car Company, Detroit, Mich. (about 20 buildings)

Detroit Athletic Club, Detroit, Mich. (Finest structure ever built of its kind.)

Palmer Building, Detroit, Mich. (Eight stories)

Ford Service Building, Detroit, Mich. (Eight stories)

Ford Motor Car Co. Factory Bldgs. (800′ x 60′ per floor)

International Harvester Co. Buildings Chicago, Ill. (Deering Plant) (Very heavy live loads)

Packard Service Building, Chicago, Ill.

Booth Cold Storage Building, Detroit, Mich.

Sommers Store Building, Indianapolis, Ind.

Y. M. C. A. Building, Cincinnati, Ohio.

Schenley Farms Warehouse, Pittsburg, Pa. (Very heavy live loads, 8 stories).

Pierce Automobile Co. Buildings, Buffalo, N. Y.

Dalley Building, Buffalo, N. Y.

Ford Service Building, Pittsburg, Pa.

Standard Automobile Co. Building, Pittsburg, Pa.

Packard Service Building, Pittsburg, Pa.

Bates Mfg Company, Weave Mill, Lewiston, Maine (400 x 600)

Pevely Dairy Company Building, St. Louis, Mo. (2 bldgs—very heavy loads)

Blish-Mise-Stillman Warehouse, Atcheson, Kansas.

Automobile Club of America, New York City.

Packard Service Building, New York City.

Morgenthaler Linotype Buildings, Brooklyn, N. Y.

Murphy Hotel, Richmond, Va.

Hicks Hotel, Savannah, Georgia.

McDermott Church, New Orleans, La. (Hooped columns supporting church tower.)

Campbell Building, Oklahoma City, Okla. (11 stories.)

Presidential Palace, Havana - Cuba, (Hooped columns supporting large dome.)

Portland Light Heat & Power Co. Buildings, Portland, Oregon;

and that said defendant notwithstanding notice by registered mail of such infringement threatens to continue the same, and does now continue such infringement of the rights secured to your orator as set forth and disclosed in the patent and reissue patent aforesaid.

X. Your orator further shows unto your Honors that he has notified said defendant by registered letter to desist from such infringement of his rights in the premises, but notwithstanding such notice

the said defendant has utterly refused and neglected to discontinue the manufacture and sale of said concrete reinforcing and threatens to continue the making, using and selling of said concrete reinforcing bars embodying the invention herein referred to, and your orator further avers that such infringement of his rights by the defendant will work an irreparable damage, loss and injury to your orator unless restrained by the order of this Honorable Court.

XI. Your orator further avers that by reason of such infringement defendant has made large gains and profits and your orator has suffered and sustained injuries and damages in a large amount, the total of which cannot be ascertained without the taking of an account and the amount of which is at present unknown to your orator.

XII. That your orator has no plain speedy or adequate remedy at law and can be relieved only in a Court of Equity where matters of that nature are cognizable.

WHEREFORE YOUR ORATOR PRAYS:

That defendant be required to answer, an Oath thereupon being expressly waived, to the best and utmost of his knowledge fully, perfectly and truly, all and singular, the things charged in the aforesaid Bill of Complaint; that said defendant, his or their several agents, employees, servants, attorneys, workmen and others acting for him, be enjoined and restrained from infringing said Letters Patent and the

Reissue thereof; that said defendant be ordered to account for and pay over to your orator the gains and profits which he has made and realized, and in addition to said actual damages sustained by your Orator because of said infringement, that the amount thereof be increased three times as provided by the law in such cases made and provided because of the wilful nature of said infringement; that to ascertain the amount of such manufacture and sales a master be appointed; and that plaintiff have his costs of this action.

May it please your Honors to grant unto your Orator a writ of injunction issued out of and under the seal of this Honorable Court, pendente lite and until final hearing, enjoining and restraining said defendant, his or their several agents, attorneys, employees, servants, workmen and others acting for him, from making, selling or using, or causing to be made, sold or used, any concrete reinforcing bars with spirally disposed coils secured thereto as set forth in said patent No. 841,741 and reissue patent No. 14,182, and that upon final hearing of this case that said injunction be made perpetual, and that your Orator have such other further and additional relief as shall seem meet in equity and good conscience.

Wherefore may it please your Honors to grant unto your Orator a Writ of Subpoena ad Respondendum directed to the Defendant, Truscon Steel Company, commanding it or him by a day certain, and under a certain penalty, to be and appear in this Honorable Court and to then and there answer

this Bill of Complaint, and to abide by such order and decree as your Honors shall then make.

GEORGE E. VANDENBURGH,
Complainant.

CARLOS P. GRIFFIN,
Counsel for Complainant.

WM. R. MILLER,
Solicitor for Complainant.

STATE OF CALIFORNIA,
City and County of San Francisco,—ss.

CARLOS P. GRIFFIN, being duly sworn, deposes and says: that he is the attorney of record for George E. Vandenburgh, the complainant herein and is familiar with the matters recited in the above entitled action; that he has read the foregoing complaint and knows the contents thereof, that the same is true of his own knowledge, except as to the matters which are therein recited on his information or belief, and as to those matters that he believes it to be true, and that George E. Vandenburgh is in Virginia and not available for the purpose of signing this complaint at the present time.

CARLOS P. GRIFFIN.

Subscribed and sworn to before me this 19th day of August A. D. 1919.

HENRY B. LISTER,
Notary Public in and for the City and County of San Francisco, State of California.

(Notarial Seal)

Filed: Sep 18 1919 B. C. Miller, Clerk, U. S. District Court, N. D. O.

[TITLE OF COURT AND CAUSE.]

ANSWER.

FIRST: The defendant admits the citizenship and corporate organization of the parties as alleged.

SECOND: The defendant has no knowledge as to the allegations of the first numbered paragraph of the bill of complaint and therefore denies the same and leaves the plaintiff to his proofs.

THIRD: Defendant has no knowledge as to the allegations of the second numbered paragraph of the bill of complaint except as to prior knowledge, use, sale, patenting and description, and thereupon denies the same and leaves the plaintiff to his proof, but specially denies that such invention was new, useful, and not known, used, patented or described more than two years prior to May, 1906, and avers that same was old, inutile, known, used, patented and described as hereinafter set forth.

FOURTH: Defendant admits the allegations of the third numbered paragraph of the bill of complaint.

FIFTH: Defendant admits that part of the fourth numbered allegation of the bill of complaint averring the application for and issuance of the patent, but denies that such proceedings were regular or secured any rights to the plaintiff as claimed by the plaintiff herein.

SIXTH: Defendant admits the allegations of the fifth numbered paragraph of the bill of complaint.

SEVENTH: Defendant specially denies that part of the sixth numbered paragraph of the bill of com-

plaint in which it is averred that it appeared to the plaintiff or was true in fact that said Letters Patent were defective and insufficient by reason of the fact that the plaintiff claimed more than he had a right to claim as new and by reason of the fact that the verbiage of the claims was defective in not precisely corresponding with the terms of the specifications and denies that by the reissue and delivery of said patent the plaintiff was granted rights of the same effect and operation in law as if the same had been originally filed in such corrected form and that any errors or mistakes in the original patent arose by accident or inadvertence and without fraudulent or deceptive intention on the part of the plaintiff, and otherwise admits the allegations of said paragraph.

EIGHTH: Defendant denies the allegations of the seventh numbered paragraph of the bill of complaint to the effect that all requisite proceedings were had prior to the reissuance of said Letters Patent which were required by law in such case; and otherwise admits the allegations of said paragraph.

NINTH: The defendant has no knowledge as to the allegations in the eighth numbered paragraph of the bill of complaint except as hereinafter stated and thereupon denies the same and leaves the plaintiff to his proofs in such respect; but defendant says that such decision of the United States Circuit Court of Appeals was rendered upon an inadequate, incomplete and insufficient presentation of the matters and things involved in the question of the validity of such patent and reissue as hereinafter presented herein.

TENTH: Defendant admits that within six years last past it has made at Youngstown, Ohio, and sold to divers persons and corporations several thousand tons of concrete reinforcing for use in many structures covering a large part of the country, a partial list of which is given in the ninth numbered paragraph of the bill of complaint; but denies that same was done for the purpose of injuring and damaging the plaintiff or to the injury or damage of the plaintiff by reason of the plaintiff's patent claims or otherwise. Defendant admits that recently, within such six years, it has had notice by registered mail that plaintiff claims infringement but denies that it has infringed any valid patent claims of the plaintiff.

ELEVENTH: Defendant admits the allegations of the tenth numbered paragraph of the bill of complaint that it has been notified by plaintiff by registered mail to desist from infringement of plaintiff's rights and has refused to discontinue the manufacture and sale of concrete reinforcing and expects to continue to make, use and sell all its various types of concrete reinforcing, but denies that such manufacture, sale and use embodies any invention or valid patent rights of the plaintiff or infringement of same and will work damage, loss and injury, irreparable or otherwise, to the plaintiff.

TWELFTH: Defendant denies the allegations of the eleventh numbered paragraph of the bill of complaint.

THIRTEENTH: Defendant admits the allega-

tions of the twelfth numbered paragraph of the bill of complaint.

FOURTEENTH: Defendant further answering, upon information and belief says and charges the fact to be that said original patent No. 841,741 and reissue patent No. 14,182 are void and of no effect in law for the folowing reasons:

(a) That for the purpose of deceiving the public the descriptions and specifications filed by the patentee were made to contain less than the whole truth relative to the inventions or discoveries or more than was or is necessary to produce the desired effect.

(b) That while the application for said Letters Patent was pending in the United States Patent Office, the applicant for said patent so limited the scope and confined the claims of his application under the requirement of the Commissioner of Patents that the plaintiff cannot now ask for and is not entitled to insist upon or obtain construction of the claims of said patent sufficiently broad to include or cover any construction or device embodied in or used by defendant.

(c) That the things patented in said Letters Patent numbered 841,741 and 14,182 had been patented and described in printed publications in the United States and elsewhere prior to the supposed invention and discovery of said patent and more than two years prior to plaintiffs original application for Letters Patent in the following United States Letters Patents:

[Amendment made by leave of Court this 9th day of June, 1920. B. C. Miller, Clerk.]

Weinig, #168,948 1875
Phelps, #175,155 1876
Bauman, #212,645, 1879
Carson, #278,220, 1883,
Monier, #302,664, 1884,
Randall #349,603, 1886,
Harmon & McNutt #380,627 1888,
Salisch #417,397 1889,
Stempel #411,360 1889
Miles, #429,935 1890
Bond, #432,930 1890
Prescott, #447,162, 1891
Stempel, #468,269 1892,
Brinkman 530,064 1894
Norwood, 571,575 1896
Clark, #589,593, 1897,
Johnson #589,898, 1897,
McCall, #657,827, 1900,
Martin, #674,538, 1901
Caldwell, #682,316, 1901
Villet, #722,417 1903
Eason, #723,657 1903
Kahn, #736,602, 1903
Considere, #752,523, 1904,
Carey, #756,471 1904,
Cummings, #764,883, 1904,
Pohlman, #766,899 1904,
Kahn, #768,284 1904,
Gardner, #785,417 1905,
Peabody, #805,663 1905,

Golding, #815,157 1906
Cummings, #815,409 1906
Muesser, #815,617 1906
Cumings, #822,587 1906
Cummings, #828,931, 1906.
In the following British Letters Patent:
Hyatt, No. 1715, of 1874.
Lee and Hodgson, No. 14,559 of 1885.
Banks, No. 12,228 of 1893.
Dumas, No. 20,675 of 1902.
Wells, No. 12625 of 1904.
Coignet, No. 24,371 of 1904.
In the following German Patent:
Kieserling & Moller, No. 73,004 of 1892.
In the following French Patent:
Pellegrin, No. 323,457 of 1902.
In the following Swiss Patents:
Munch, No. 19,279 of 1900.
Mollins, No. 29,781 of 1903.

and in publications as follows:

"Le Beton Arme" by Paul Christophe, published in France about 1900 and in the United States in 1902.

The Engineering News, published in this country, article by Charles H. Marquess, "Design for a Reinforced Concrete Column Without Patented Features" about August 18, 1904; for March, 1906 showing columns for Hotel at Atlantic City, N. J.; for June 23, 1904, showing design for Reinforced Concrete Bins for Grain Elevators; for June 15, 1905 "Result of Comparative Tests of Plain and Reinforced Concrete Columns".

Articles by Armand Considere, published in France and Germany, a communication to the French Academy of Science about 1900, on the effect of hooping on concrete, "Gene Civil" and "Beton und Eisen" about 1902, translated in part into English and published by McGraw Publishing Co. in New York in 1903 under title "Experimental Researches on Reinforced Concrete", besides other patents and printed publications which are at present unknown to this defendant, but which it craves leave, when ascertained, to insert in this answer by amendment, with the same force and effect as though the same had been originally included.

(d) That plaintiff was not the original and first inventor or discoverer of any material or substantial part of the things patented in said Letters Patents, Nos. 841,741 and 14,182, and that the various patentees and assignees and other persons mentioned in patents and publications listed in paragraph (c) hereinbefore had knowledge and made use of and there was in public use and on sale in the U. S. and elsewhere the things alleged to be patented by plaintiff and of every material and substantial part thereof or the equivalents thereof prior to the alleged invention specified in the bill of complaint and more than two years prior to plaintiff's original application at places mentioned in said patents and elsewhere in this country and that knowledge and use of the things alleged to be patented and of every material and substantial part thereof had been known to, and made and publicly used, prior to the alleged invention specified in the bill of complaint,

by Frederick P. Smith, 58 West Lake Street, Chicago, Illinois, Edward McClure, 109 East Lake Street, Chicago, Illinois, and by Robert A. Cummings at Hampton, Virginia, in 1903; at Richmond, Va., about March, 1904; at New York, N. Y.; Pittsburgh, Pa.; and Dennison, Ohio, about 1905 and 1906; by Julius Kahn at Atlantic City, N. J., in January, February and March, 1906 and for several months prior thereto at the places hereinbefore mentioned and elsewhere in this country, besides many other persons whose names and addresses are at present unknown, but which defendant craves leave to insert in this answer as soon as ascertained with the same force and effect as though the same had been originally pleaded herein.

(e) That the things described and claimed in the said Letters Patent had been on sale and in public use in the United States for more than two years before the application for said Letters Patent and that the persons hereinbefore named as having had prior knowledge and use of the alleged invention, and many others, knew of said public use and sale.

(f) That it appears from matters appearing upon the face of said patent sued upon and from various well known facts of common knowledge of which the court will take judicial notice, that the claims of the said patent are invalid and void.

(g) That the invention claimed in the patent in suit is substantially different from any indicated, suggested, or described in the original application therefor.

(h) That the description of the invention in the

specifications of the patent in suit is not in such full, clear, concise and exact terms as to describe and support the alleged invention covered by the claims and justify the allowance thereof.

(i) That the Commissioner of Patents exceeded his legal authority in issuing and was without jurisdiction to issue the patent in suit.

(j) That the description of the invention in the specification of the patent in suit is not in such full, clear, concise and exact terms as to enable any person skilled in the art or science to which it appertains or with which it is most nearly connected, to make, construct, compound and use the same.

FIFTEENTH: That the plaintiff during the time his application for such patent and the reissue thereof was pending in the Patent Office and in the course of the pursuance of such application, and to induce the Patent Office and the officers thereof to allow and issue such patent as the same was allowed and issued, stated and represented to the Patent Office and the officers thereof in substance and effect that his application claim did not pertain to the use of devices such as are used by the defendant in the manufacture and sale of concrete reinforcing and thereby procured the issuance of the patent in suit in the manner and for as issued and is thereby estopped to contend that the manufacture of the defendant infringe the patent in suit and has thereby waived any rights or claims in respect thereto.

SIXTEENTH: That the plaintiff during the time his application for such patent and the reissue thereof was pending in the Patent Office and in the course

of the pursuance of such application, and to induce the Patent Office and the officers thereof to allow and issue such patent as the same was allowed and issued, stated and represented to the Patent Office and the officers thereof in substance and effect that his application and claim did not pertain to the use of devices such as are used by the defendant in the manufacture and sale of concrete reinforcing, and particularly in respect to the then contention of the plaintiff, that his coils of reinforcement were rigidly affixed in the kerfs of his bar for the purpose of establishing, securing and making as a part of his invention a truss action in concrete in respect to a bar reinforcing concrete, as distinguished from columner enclosure of concrete, through the truss action between said bar and said coils rigidly affixed thereto, and thereby procured the issuance of the patent in suit in the manner and form as issued and is thereby estopped to contend that the manufactures of the defendant infringe the patent in suit and has thereby waived any rights or claims in respect thereto.

SEVENTEENTH: Defendant further avers that said original patent No. 841,741 was a mere paper patent procured to be issued in an effort upon the part of the plaintiff to copy, imitate and provide a patentable substitute for a reinforcing bar in concrete of the type theretofore designed by Julius Kahn and now owned by the defendant as assignee and was inutile and valueless as such, and no effort was made to manufacture and use under the same or to advance the interests of the public by introducing the same into use, and thereafter this defend-

ant and many others engaged in the business of manufacturing and selling columner reinforcement and at large expense for experimental and testing purposes, and for advertising and introducing such columner reinforcement, built up a large and valuable business therein upon the faith of the records of the Patent Office of the United States as then existing and upon the knowledge that the plaintiff had or claimed no patent rights inconsistent therewith or to be infringed thereby; that the conditions as aforesaid existed and continued for about nine years; that thereupon and thereafter the plaintiff conceived that he might procure a reissue of said patent No. 841,741 in such form as to secure to himself the benefits and advantages of the business so built up by the defendant and others as aforesaid throughout the United States and falsely and fraudulently represented to the Patent Office that his said original patent was defective and insufficient by reason of the fact that he had claimed more than he had a right to claim as new and that the verbiage of the claim was defective and not precisely corresponding with the terms of the specifications, and made application for a reissue patent and thereby procured the issuance of the reissue patent No. 14,182 in suit; whereby plaintiff is estopped and precluded to claim infringement of said reissue patent even though otherwise entitled thereto by reason of such intervening right thereto on the part of the defendant and others.

EIGHTEENTH: Defendant makes the averments of the last numbered preceding paragraph part hereof and therefore says that by reason of

the delay and laches of the plaintiff in putting the alleged invention of his original patent into use and in making application for reissue, the plaintiff had abandoned and waived all rights to procure such issue, and particularly against this defendant, and such reissue is void and of no effect.

NINETEENTH: The defendant says that by reason of the broadening of the claims in said reissue patent and because the original patent was not inoperative and invalid because of defective or insufficient specification and by reason of the original patentee not having claimed as his own invention or discovery more than he had a right to claim as new, and thereupon narrowing his claims, there existed no jurisdiction in the Patent Office of the United States to allow and issue such reissue patent.

TWENTIETH: Defendant denies that the structure set forth in said reissue patent No. 14,182 constituted an invention at any date less than two years prior to May 9, 1906.

TWENTY-FIRST: Defendant denies that the plaintiff was the original and first inventor of the inventions claimed in said reissue patent, No. 14,182 or that said patent and the structures described in the specifications alleged to support the same involved the exercise of the inventive faculty and affirmatively avers that the plaintiff was not the original and first inventor and that the structures described and the claims made did not involve the exercise of the inventive faculty or anything more than the mere application of skill in the art in the com-

bination and application of devices well known in the prior art.

TWENTY-SECOND: Defendant further avers that during the prosecution of the application on which matured into Letters Patent 841,741, now canceled, the claims were so restricted that the same do not now cover or include anything made, used or sold by the defendant; that plaintiff's own statements during the prosecution of said application show that he did not intend the claims to include structures like that made by defendant and that such statements and limitations were not changed by the reissue Letters Patent.

TWENTY-THIRD: Defendant further avers that structures were disclosed in patents hereinbefore referred to and publicly used prior to the date of application for said reissue Letters Patent which prevent said reissue letters patent from being construed to cover anything now or heretofore made, used or sold by this defendant.

TWENTY-FOURTH: Defendant says that plaintiff, for the purpose of endeavoring to secure other, further and different rights under said reissue patent, as a consideration therefor, and voluntarily, fully and completely surrendered and caused and permitted to be cancelled said original patent to plaintiff and all rights thereunder except such rights as were secured to plaintiff by said reissue patent as accepted by him, and that plaintiff has no patent rights of any kind or character except under said reissue patent, which defendant says is utterly void

(Testimony of George E. Vandenburgh.)

because of the matters and things hereinbefore set forth.

All of which foregoing denials and averments this defendant is willing and ready to prove as this Court may direct.

WHEREFORE defendant prays to be hence dismissed with its costs in this behalf sustained.

W. F. GUTHRIE,

Solicitors for Truscon Steel Company, Youngstown, Ohio.

E. N. PAGELSEN

Of Counsel.

Filed Oct 1 1919 B C Miller, Clerk, U. S. District Court, N. D. O.

PLAINTIFF'S TESTIMONY.

In the opening statement, plaintiff's attorney stated that the plaintiff was only going to undertake to sustain claims 1 and 3 of the patent in suit, and thereupon called as a witness

GEORGE E. VANDENBURGH,

who, being first duly sworn, stated in answer to questions by Mr. Griffin, that his present residence was 1005 Eighth Street, Washington, D. C., that he was 57 years of age, and that he is the George E. Vandenburgh who brought an action against the Electric Welding Company of Pittsburgh, and the Concrete Steel Company of New York upon this same patent, reissue No. 14182.

That said invention was made in February, 1903.

(Testimony of George E. Vandenburgh.)

Objected to by defendant as stating a conclusion. That said invention was not known or used by others or patented or described in any printed publication prior to his invention thereof to the best of his knowledge; that he made application for patent on said invention May 9, 1906, upon which a patent was regularly granted January 22, 1907; that he is not an expert in patent matters, but is a bricklayer and mechanic; that upon the suggestion of Mr. Carlos P. Griffin on July 1, 1916, he made application to have said patent reissued because there were several mistakes in the wording of some of the claims, and one claim was too broad. It called for any kind of a fastening, whereas he invented the kerf fastening and wanted to limit all claims to his invention. One of the claims also called for the end of the bar instead of the edge. Such mistakes were unintentional and the patent was duly granted on the application. I granted a license to a Chicago concern that put up a building in San Francisco. I threatened suit and they compromised by taking a license and paying one year's royalty. They have since gone out of business. Also, since the decision against the Concrete Steel Company in New York, I have licensed the Corrugated Bar Company of Buffalo, New York.

The validity of Claim 3 has been established, and this is the plaintiff, George E. Vandenburgh, in an action decided on appeal by the Circuit Court of Appeals of the United States for the Third Circuit at Philadelphia, No. 2479, against the Electric Weld-

(Testimony of George E. Vandenburgh.)

ing Company, the opinion being received and filed February 19, 1920, and also the plaintiff in an action brought in the Southern District of New York against the Concrete Steel Company, entitled Equity No. 14-88, and decided on appeal by the Circuit Court for the Second District, April 16, 1919, appeal No. 172. Both of said appeals on patent No. 14182.

It is also stipulated that the opinions in the trial and reviewing court in each of these cases may be considered by the court here on appeal by reference to published copies thereof, typed or uncertified copies, presented by counsel without incorporating the same into the record, and the same stipulation is made as to the printed record in both cases. A copy of re-issue patent 14182 was thereupon offered in evidence as "Plaintiff's Exhibit 1." Thereupon a cut of a photograph filed by defendant upon the preliminary hearing was offered in evidence and attorney for defendant admitted it to be a correct photograph of defendant's construction. This cut was marked "Plaintiff's Exhibit 2" and received in evidence. Mr. Griffin thereupon offered the original patent and the same was marked "Plaintiff's Exhibit No. 3, No. 841741." Thereupon pages 26 and 27 from a booklet entitled "Kahn Building Products. Trussed Concrete Steel Company, Youngstown, Ohio," now the Truscon Company of Youngstown, Ohio. Pages 26 and 27 admitted to be put out by defendant was offered and received in evidence as "Plaintiff's Exhibit No. 4."

Q. Will you describe the way the Truscon Spir-

(Testimony of George E. Vandenburgh.)

als are secured to the longitudinal spacing or reinforcing bars?

A. I have a small model of it.

Q. I want you to describe it for the record.

A. It is not exactly as they turn it out. They turn it out with a "T" instead of the flat bar. In the bridge at San Diego, California, they used the flat bar, 1-3/4" wide, 3/8" thick bar. They so arranged it with the slot right down in and they hit both these sides to form the overlap. That is, they hit one side and there they hit it on both sides. No matter if you hit one or both sides, it is the same thing. This is mine; I cut in this way, and we strike it on the bevel, hit the one side or both, it is the same thing, and turns out with the same results exactly. I made this like the bars that were used in that bridge at San Diego, California. They are putting in four now. They put in two fastened and two extra ones when they set it up. In the patent drawing I used one bar. They can use any amount of bars they see fit to use, and this type of spiral construction with perpendicular bar is used in columnar construction for beams. They used a single coil. You see, in the cut there is two types, with coils single and double, one wound right and the other wound left. Those drawings were got up some years ago, and drawings in them days were not as fine as they are today and everything was not put in. I have seen several different sizes of bars but only one size in the "T" bar that I would call one

(Testimony of George E. Vandenburgh.)

inch or 1-1/4 inch; I did not measure it. The small model is here introduced in evidence as "Plaintiff's Exhibit No. 5."

(Pages omitted in narrative reduction.)

(Testimony of George E. Vandenburgh.)

CROSS EXAMINATION BY MR. GUTHRIE:

Exhibit No. 5 is intended to represent the inclined cuts or kerfs covered by the patent. In the model last referred to, the wire or rod is held by smashing down and forming a kerf on one side of the right angle cut. The Truscon Steel Company had a kerf on both sides in 1914 where the kerf on one side will do the work as well as the kerf on both sides. At the time this suit was commenced the Truscon Company was using a coil embraced in the cut in a "T" bar, and I know positively they used both. The defendant was using a "T" bar before I commenced this suit. I did not mean to suggest to the Court that any column hooping made by the Truscon Steel Co. at any time had bars in proportion to the rods as disclosed in Exhibit 5, as that is not put up by scale.

Mr. Griffin: An objection is here made on the ground that it is immaterial what scale the bars are.

I do not contend that the model is made to scale. Defendant's Exhibit No. 1 is the only style of its construction I have seen and correctly represents it. I helped install the Kahn reinforcing bar, the sheared bar in Freedman Hospital in 1906, as this work was begun as soon as the season opened in 1906. I think in July, something like that, I couldn't say the time. The construction was not similar to any I saw in Kahn patent No. 736602. The construction I helped to install in Washington had a main longitudinal tension member at the bottom and running

(Testimony of George E. Vandenburgh.)

up obliquely from it on each side of the center and on opposite directions from each side of the center were subsidiary web members.

Mr. Guthrie: I move to strike out the statement that he made the invention in 1903 and first employed it in February, 1903, as a conclusion.

The Court: I will overrule the motion.

Vandenburgh: Two different licenses were taken out, one last year and one three years ago, 1916. They were different manufacturers. The 1916 license was after the re-issue of the patent to a Chicago concern that had put up a building in San Francisco. I threatened to sue and they paid the royalty on one building and then went out of business. The Corrugated Bar Co. of Buffalo was the 1919 licensee. I never had a suit with them. I had never seen this hooping until after I got my original patent out. I did not try to enforce my patent prior to its reissuance. I tried energetically to get my construction on the market for columns and piling. I never got anybody to go into it. There were too many agents for the other stuff against me. All the concrete engineers were solicited by agents for every style of construction to put up their design.

Q. Why did you not sue some of them for infringement?

A. They hadn't the same as I was, as mine.

Plaintiff thereupon rested.

Mr. Guthrie: Defendant offers as "Exhibit 2" all the patents pleaded in the answer, and offers as

(Testimony of George E. Vandenburgh.)

"Exhibit 3" from the record of the Pittsburgh case commencing at page 175 to and including page 186 consisting of extracts from "Experimental Researches on Reinforced Concrete."

(Pages omitted in narrative reduction.)

(Testimony of F. E. Turneaure.)

Thereupon defendant called

F. E. TURNEAURE

who, being first duly sworn, testified as follows:

My name is F. E. Turneaure living at Madison, Wisconsin, age 54. I am dean of the College of Engineering of the University of Wisconsin.

Mr. Griffin: I will admit the professor's qualifications. I have read his articles many times.

I have written several books on reinforced concrete.

Q 9. Will you kindly explain to the Court the respective functions of the metal reinforcement and the concrete in a reinforced concrete beam, with reference to what is known as a beam connection in the science of concrete reinforcing?

Mr. Griffin: If your Honor, please, I must object to that as irrelevant and immaterial. This case is limited to columns and the way beams, slabs or columns may break is of no moment as to the construction involved in this patent.

Objection overruled.

(Exception by plaintiff.)

A. Thinking of a beam as in a horizontal position, with a load on the top of it, the principal stresses resulting in the beam are the tension stresses on the lower part of the beam, the lower half, and compression stresses on the upper half, these being greatest near the center of the beam. There are other stresses which are less important. Now, con-

(Testimony of F. E. Turneaure.)

crete being a material of great strength in compression and of small strength in tension, is not well suited to act as a beam without reinforcement. So to carry the tensile stresses in the lower half of the beam, the first step really in the development of reinforced concrete was the insertion of metal rods near the lower side of the beam, longitudinally, so as to carry those tensile stresses. That was really the first step in reinforced concrete beam design. Now experiments and practice proved that the reinforcing was not sufficient, that a heavily loaded beam, and especially a deep beam compared with its length, would develop other stresses, especially near the ends of the beam, and if this reinforcing rod is inserted horizontally in the beam and is straight throughout its entire length, the beam would develop diagonal cracks near the end of it which would cause failure, even though the center of the beam might be perfectly sound.

Defendant's Exhibit 5 was here offered and marked.

This illustration fairly represents what I mean by diagonal cracks. To overcome this tendency to crack in a diagonal fashion near the end of the beam, various devices were applied in the way of reinforcement, either in a diagonal or vertical direction, this secondary reinforcement to be connected in some way to the main horizontal rod. With these secondary members added, the metal reinforcement became more efficient.

(Testimony of F. E. Turneaure.)

Kahn patent No. 736602 illustrates the method of meeting these diagonal fracture stresses.

Q. 12. In a construction of that kind, to what extent is the tension developed in the main longitudinal transferred to the subsidiary diagonals, not in figures or percentages, but in what manner?

A. At the center of the beam, the ordinary beam, supported at the ends, all of the tensile stress practically is taken by the horizontal member. Now, as you pass from the center towards the ends of the beam, the stress in that horizontal member is transferred gradually to the concrete and to these secondary diagonal members. Of course, at the very end of the member, where the member ceases to exist, all of that stress must so have been transferred. Now a considerable part of that stress is transferred to these secondary diagonal members, just exactly how much it is impossible to say. The longitudinal is the main member and the diagonals are secondary members, to strengthen the concrete in this diagonal direction.

The Pohlman Patent No. 766899 with its loops d, attached to the main member a, appear to have the same function as the diagonals of the Kahn patent, and the same may be said of the Peabody patent No. 805663, Figures 1 and 2. This is also the function of the obliquely extending loops 6 of the Golding Patent No. 815157.

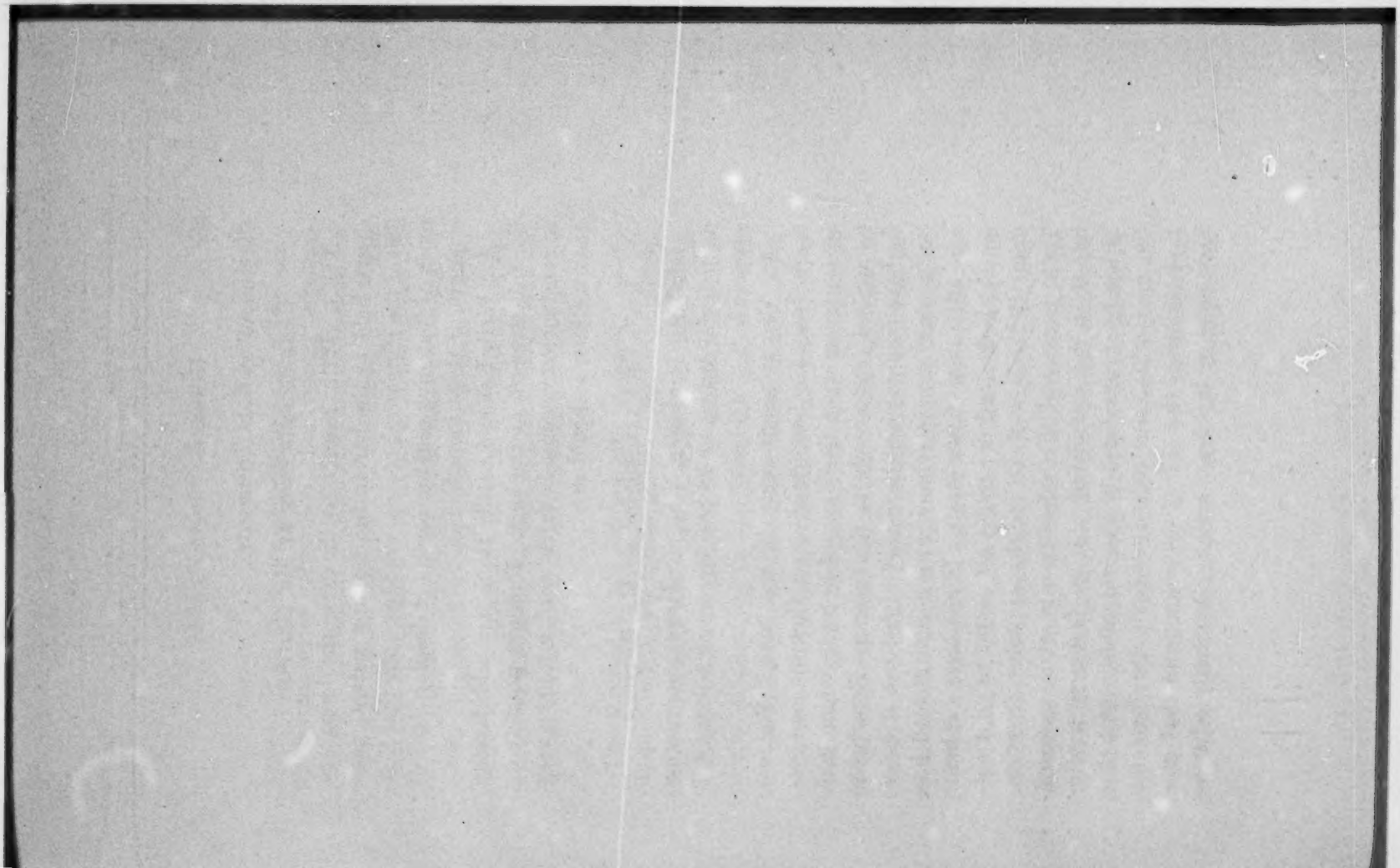
In the Kahn patent the method of securing the diagonals to the main member either involved the independent attachment of the diagonal members by

(Testimony of F. E. Turneaure.)

rivets as in figure 10, by boring holes and inserting rods as in figures 24, 26 and 29, or the shearing of the bar itself and the bending up, as in figures 21 and 22.

The Golding patent was intended in the way of development, to devise a main bar, the attachments to which would not change the sectional area.

(Pages omitted in narrative reduction.)



(Testimony of F. E. Turneaure.)

CROSS-EXAMINATION BY MR. GRIFFIN:

XQ23. With respect to the way the loops are shown held to the bar in the Golding patent, page 320 of the Pittsburgh record, would you say that that mode of fastening could or could not develop the full strength of these loops?

A. Well, I should hardly think it would develop the full strength of the loop. It might possibly be so constructed it would be fairly good, but not a very good method, I should say.

REDIRECT EXAMINATION BY MR. GUTHRIE:

RDQ26. Professor, a beam of any construction or material can be set on end for use as a column, I suppose?

A. Yes, it might serve as a column. You get beam stresses or bending stresses, when the load gets off center or when there are other loads, which may be applied transversely to the column. Sometimes we have columns that have very high beam stresses, but a plain simple column with a central load has very little or no beam stress. If you have a column on which the load is applied off center to your column, it tends to bend in the opposite direction. There is some of that effect in a great many cases, but it is not considered a large factor generally. It has been considered to a considerable extent that the monolithic construction tends to distribute the load action so that all of the columns in that case have more or less beam action. Originally columns

(Testimony of F. E. Turneaure.)

were built on the beam principle mostly. The early reinforcement of columns in this country was carried out by means of vertical reinforcing bars which were intended to take part of the direct load. The steel rods would take care of their share in accordance with their elasticity. That was one method of reinforcing columns, and those bars were used quite extensively without any hooping or banding, except a little wire to hold the bars in place. That was the earliest form. Column stresses are now met in two ways.

The stresses in the column are, of course, pretty complex when you try to analyze them completely, but compressive stress in a column or long block carries with it a tendency to burst the column and to spread it sideways, to compress the material endways, and to shear off that material diagonally. Now, columns of different materials, where tested to destruction, will fail in different ways. If a column of plain ordinary concrete without reinforcement is tested, it will fail; if good concrete, it will fail by shearing off. You will have a columnar fracture at the ends of the broken column. Now, there is at the same time a tendency to burst. This is shown by the test of steel and wrought iron. It bulges out sideways, because iron will do that to some extent. Now, the first reinforcement, as I already stated, consisted primarily of vertical rods simply held in place at intervals. Now that did help support the direct load, but it did not help to prevent this bursting action, so that those columns would fail in about the

(Testimony of F. E. Turneaure.)

same way as plain concrete. Now early students of column construction—earlier in foreign countries than in this country—conceived the idea of banding a column to prevent the bursting action. Considerre, who is one of the earliest writers on the subject, explains the action thoroughly. I think about 1902. Banded columns of various kinds were used before Considerre. Now that banding, hooping effect, is entirely different than the vertical rod reinforcement effect, different altogether. It is to prevent the concrete from bursting laterally, and if a column of that sort is tested in a testing machine, it will show a very great degree of ductility. It will bend laterally, perhaps, several inches before it will break. Now since the development of that hooping, the two kinds of reinforcement have been used more or less together. Both rod and banding.

Mr. Griffin: We do not claim bands. We don't claim anything but spirals, in combination with the kerf method of attaching the perpendicular or longitudinal bar. As to the general action of columns and the benefit of spiral hooping, I agree with the statements of Considerre who disclosed spiral banding. I do not find in any examination of the Considerre reference anything about securing the longitudinal to the spirals by integral means.

The Vandenburgh patent describes and specifies a reinforcement for beams, that incidentally refers to this reinforcement for columns. The figures, with the exception of figure 6, show the arrangement of

(Testimony of F. E. Turneaure.)

the bar and the so-called coils, figure 1 illustrating pretty well the general idea.

Figure 1 shows the general arrangement of the bar and these spiral members as they would be used in a beam. Figures 2, 3, 4 and 5 are enlarged diagrams illustrating the details of these coils. As shown in figure 1, these coils are arranged around the bar in a diagonal, so that they slope in a diagonal direction—to the right of the center and to the left of the center—with the apparent purpose, evident purpose, of taking care of these diagonal tensile stresses which I have explained occur in beams. The principal reinforcement is the horizontal bar. The coils constitute a secondary reinforcement, which, in other patents, is provided for in other ways. Figure 6, with two references, I believe, in the descriptive material, indicate that this bar with these coils may be used in columns. That, in general substance, is what the description conveys to my mind. The descriptive references to truss action in the patent indicates that a bar with secondary members, as described here, constitute the metallic frame-work, which in connection with the concrete in a beam, make together a sort of truss; and the general principles of truss action, as actually used in connection with such an arrangement, a truss being a frame-work acting as a beam, so that the steel or metal reinforcement, together with the concrete, constitutes his truss which acts as a beam.

A beam is generally thought of as a solid continuous material, an ordinary bar supported at each

(Testimony of F. E. Turneaure.)

end. A truss performs the same services as a beam, except that it is made up of individual members, such as a frame-work for bridge work. Covers a span, doing the same work, but more economically than a beam.

RDQ39. Examining Plaintiff's Exhibit 2 and Defendant's Exhibit 1. Do you find in the Vandenburgh reissue patent anything describing to you or even suggesting to you a construction of the character of Defendant's for columnar reinforcement?

Mr. Griffin: If your Honor please, I object to the question as purely calling for a conclusion of the witness. It is a matter that the Court has to interpret.

A. No sir. The Vandenburgh patent reads in an entirely different direction. Assuming that we had no previous knowledge of the distinct idea of band, spiralling or otherwise encircling and embracing columnar concrete, I would not find in the Vandenburgh reissue patent anything to suggest the adoption of that method of construction. The reason for that is the Vandenburgh patent relates to the reinforcing for a beam, a combination of a large horizontal rod with secondary coils, so as to form what is called truss action. This is mentioned a number of places in the descriptive material. Now, figure 6 shows how two of these bars with their coils might be put together, an impracticable arrangement, however, for use in a column. Now one knowing about beam reinforcement would appreciate the desirability of placing those coils in a diagonal direction, as shown in all of those cuts. One would understand

(Testimony of F. E. Turneaure.)

also that these large rods, placed in a vertical direction in figure 6 would reinforce a column by the vertical action of the rods, but I do not think anyone would get an idea from figure 6 and this general description, of what is developed or what was developed at that time, in the form of spiral reinforcement, in which the spiral reinforcement performed a distinct function.

I take figure 4 as a mere detail or piece of figure 1, because in the description it refers back to figure 1 in mentioning figure 4. Figure 1 shows the entire construction and figure 4 a mere detail, assuming a single coil. Figure 3 shows how the thing can be made, using a double coil. In figure 6 all of these coils are inclined in the same manner as they are in the diagram in figure 1. It does not appear that they suggest at all the fundamental notion of spiral and hoop reinforcement as the primary reinforcement. Furthermore, figure 6 illustrates what has been done with other kinds of beam reinforcement when used in columns. When put in there, it would give the idea these diagonals do some good, but it is not a very scientific arrangement.

Figure 6 is impracticable because the coil is bunched together like that, and it does not occur to me you would get a very good job of concrete, and it does not appear to me you actually could with the coils so closely meshed together as indicated in that figure. The coils would interfere with the tamping of the concrete. You could not get a good quality of concrete.

(Testimony of F. E. Turneaure.)

The actual function and purpose of the longitudinal in concrete columns is that of spacing pieces. Practice and results do not call for that bar to be of any greater strength or dimension than is necessary to keep the coils in place during the period of pouring in the concrete. Engineers in calculating the strength of concrete columns do not take into consideration as reinforcement the longitudinal bars.

In a construction such as is shown in Defendant's Exhibit 1, if the total sectional area of the longitudinal, even if not reduced by cutting of the slots, does not exceed 7/8 of an inch, I could regard this reinforcement as of no consequence, assuming you would not put in enough bars to make a filler. It is possible to put instead of these, additional large bars, which is sometimes done. In the beam reinforcement of the type of the Vandenburgh patent the bar is the chief thing, and that has got to be designed in proportion to the load.

RDQ54. Now in designing or fabricating this type of column hooping construction, by what rule, or according to what practice, or because of what element, would be determined the question of whether the reinforcing spiral was attached to the spacing bar by one kind of weld or another kind of weld, or by tying on with wire, or riveting it on with rivets, or running it through a hole in the bar, or using special metal clips between the bar and the spirals, or the cutting of notches, or the cutting of diagonal

(Testimony of F. E. Turneaure.)

kerfs, or some other method of affixation, what would determine the selection in that respect?

Mr. Griffin: I object to the question as entirely irrelevant and immaterial.

A. That would be a matter of personal choice in each instance; that is, the judgment of the designer.

(Pages omitted in narrative reduction.)

(Testimony of F. E. Turneaure.)

RECROSS EXAMINATION BY MR. GRIFFIN:

RXQ57. Professor, beam reinforcements were largely used in the production of columns in the early days of the concrete reinforcing art, were they not?

A. To some extent, yes sir. Columns have some bending stresses in them and sometimes they are designed with particular reference to those and sometimes not. They are sufficiently strong but that does not necessarily involve any steel reinforcement for that purpose. That is to say, there may be no special reinforcement in the column for that purpose, although the designer well knows there is some beam action. And although that is taken into account in making that design, there is a great deal of construction in which the designer judges the beam action is small and he can disregard it entirely. Even if the loops of concrete reinforcing are not circular, are not exactly evenly disposed, they still have some effect as reinforcing. Square rectangular loops I would not say give good reinforcing effect. I think a rectangular loop is a very poor kind of reinforcing. It may be largely used, but I do not think it is largely depended for true hoop reinforcement. If the hoop is not perfectly circular, or slightly unevenly disposed it would still be reinforcing. It is a matter of relativity, I suppose, whether good or bad. The spirals need not be exactly uniform.

In an examination of the Vandenburgh patent I do not find the structure limited by any wording to

(Testimony of F. E. Turneaure.)

beam construction. I don't say it was expressly limited to beam work. I mentioned others.

I find in Plaintiff's Exhibit 2 and Defendant's Exhibit 1 spirals with a longitudinal connection bar, means integral with the longitudinal connecting bar to hold the spiral in each instance, and in each instance the spiral is seated in a slot in the edge of the longitudinal bar. There would be nothing inherently impossible in intermeshing two coils as are shown in Figure 6.

RXQ77. You are familiar with the fact that the Patent Office drawings are never made to exact scale?

A. No: but this inclination in this drawing was evidently made with a very distinct purpose, because everybody who knows enough about concrete, knows that inclination is worth something in a beam and is not worth anything in a column.

There would be no serious disadvantage in intermeshing two such coils of the same size. In the matter of taking care of truss stresses the spiral form and band form are substantially the same thing. The spiral is not regarded as having distinctive superior merit. It is a matter of having the spirals placed close enough to perform their function. Spiral reinforcement used alone makes a very tough, reliable, ductile column, which will bend without breaking. It does not burst or shear off. You can bend them three or four inches out of line. Now, if you want a smaller sized column that will bear a heavy load so that you don't have to take up a lot of space with it,

(Testimony of F. E. Turneaure.)

you can increase the strength of the column by putting in longitudinal rods wired to them in some convenient way, and when walled in with vertical rods they help to take the load, and the number of vertical rods is up to the engineer in designing the particular structure.

RXQ83. Why is it that most of the spirals used today are used in connection with spacing bars to which the spirals are connected by means integral with the bars; that is, by spurs or corners hammered down?

A. I suppose it is more economic and convenient to make them that way. They are easily set up in the shop, easily handled, easily shipped and it is easier to get them in a uniform position.

RXQ88. In fact, there are a number of advantages of such a construction, are there not?

A. There are some I can think of. I am not a practical builder, so I probably haven't thought of all of them. There are advantages. There might be over some other construction. I do not have any in mind now, but it is very evidently a good arrangement.

(Pages omitted in narrative reduction.)

(Testimony of F. E. Turneaure.)

REDIRECT EXAMINATION BY MR. GUTHRIE:

I meant simply to say that not only bands but spiral hooping must be fairly close in order to have this protective action. If you put the spirals in there in the right distance apart or bands either, for that matter, that band will accomplish the purpose or function. I don't believe I could give offhand the relative distance that should exist between the spirals. It is pretty well standardized right now. It would be well outside of the standard if the spirals were the distance apart nearly and substantially half of the diameter of the spiral that would be too wide.

Mr. Guthrie: We offer from the Pittsburgh Record the file wrapper and original Vandenburgh application. Also the file wrapper of the reissue patent at page 353 of the Pittsburgh Record. We also offer from that record patents to McClure, Wedmore and Clement shown on pages 381 and 384 and 387.

Mr. Griffin: I object to the subsequent patents offered.

Objection overruled.

(Pages omitted in narrative reduction.)

(Testimony of Julius Kahn.)

Defendant thereupon called

JULIUS KAHN

who, being first duly sworn, testified as follows:

My name is Julius Kahn, my residence Youngstown, Ohio, my age 46. I am president of the defendant company and have been since its organization. The company was originally organized to manufacture the Kahn truss bars disclosed in patent 736602 and began the manufacture of column hooping about 1907 or '06. Column hooping abroad became active about 1902. In this country I would say they began to adopt it about the same time we started in business, in 1903. We didn't in reality adopt it until a couple of years, I would say, after we started in business. Column hooping was not a manufactured product at that time. The manufacturing has been limited pretty much on the assembling of the hooping with a spacing bar. Previous to that time spirals, merely as such, were used and were wired to longitudinal reinforcing rods in 1902 and 1903.

Considere, as a matter of fact, did not assemble the complete construction at all; he just had the spirals which were wired to a vertical bar or vertical bars.

Q8. When did your company first begin to provide either for the assembly in the field or manufacture for shipment—I don't care which—the longitudinal bars with spaces cut out of some part of the longitudinal for the receipt of the coil?

(Testimony of Julius Kahn.)

A. I would guess about 1906; I am not too sure of my dates. We originally used a flat bar for about five or six years. We have used some angle bars. I would say we began using the T bar about 1910 or 1912. We originally used a flat bar made up of a section which we had rolled, and which we called a washboard section, which had just a little prong integrally connected with the main member. I would judge we abandoned that about 1910 or 1912. After that we used the T which we are using now, which had a little rectangular cut, in its side. We inserted the spiral into that rectangular cut, and by means of a tool, hammered down the sides of the cut on the spiral. The construction illustrated in Defendant's Exhibit 1. This was adopted about 1910 or '12.

Mr. Griffin: In the Electric Welding case you said you fixed the date of your using the spirals with the integral fasteners as of December, 1907. You speak now of 1906. Is that the same thing?

The Witness: I assume it was, yes. Did I give the reason for it there?

Mr. Griffin: Yes.

The Court: That, you say, was of the washboard type?

The Witness: Yes sir; that was of the washboard type. Apparently the dates must be given on the circular here.

The Court: Your recollection of it then was probably more accurate than your present unrefreshel recollection?

The Witness: Yes sir. It says in this testimony

(Testimony of Julius Kahn.)

the date is fixed by the circular, but I do not believe he is giving me the right circular.

Mr. Guthrie: We are not claiming this is in anticipation, so it is not material.

The circular marked Defendant's Exhibit 5 shows what we call the washboard section.

Q19. Now, Mr. Kahn, commencing with the time when you commenced the construction shown in this Exhibit 1 was there anybody else at that time manufacturing and selling column hooping, where the hooping, either banded or spiral, was affixed to the spacing bar by means integral with the spacing bar itself?

A. Yes, the Smith Wire & Iron Works of Chicago.

Q21. Anybody else you know of?

Mr. Griffin: I don't like to be objecting, but I must object to testimony of this character, because it is subsequent to the time that anything can have any effect on the patent, and it is irrelevant and immaterial.

A. My recollection is that also the Corrugated Bar Company of Buffalo, and the Electric Welding Company of Pittsburgh assembled their column hooping along the same lines.

The Court: I did not rule on the objection. I do not see the materiality of what other people did after the patent, unless you are attacking the reissue patent on the ground they had no right to reissue.

Mr. Guthrie: That is one of the positions—respecting intervening rights under the reissue patent. The other is the question that always comes into these

(Testimony of Julius Kahn.)

cases of what art was built up while the patentee of the patent in suit lay quiescent with his paper patent. We will have illustration of what those people did.

Q22. Do you know anything about the Monolith Construction Company?

A. I am quite familiar with it. The Monolith Construction rolled a bar with two kerfs in the edges, and into those kerfs they inserted a small round bar and then submitted the main bar to pressure from a heavy press, which clinched the main bar on the little round bar seized in the grooved kerfs. They then wrapped the little round bar around the spiral reinforcing as illustrated on pages 293 of the Pittsburgh Record.

Q25. Do you know anything about how extensive a business was done by these other manufacturers you mentioned—the Smith Wire & Iron Works, the Electric Welding Company, the Corrugated Bar Company and the Monolith Construction Company?

Mr. Griffin: I object to any such question because it does not appear what kind of construction was made by the outside people, and unless it does, it is impossible to determine what weight it has.

The Court: I appreciate your objection, but I will receive it.

A. They did a pretty substantial business. I recognize McClure Patent No. 857821 as the construction used by the Smith Wire & Iron Works of Chicago. We were manufacturing this spiral as one of our regular products up to the time we had notice

(Testimony of Julius Kahn.)

of a claim on the part of Vandenburgh in 1917.

Mr. Guthrie: We think it may be agreed Mr. Griffin, that the Vandenburgh notice was sent out in the early part of 1917.

Mr. Griffin: In the early part of 1916.

Mr. Guthrie: After your reissue patent.

Mr. Griffin: We notified the trade prior to the reissue of the patent and immediately after the reissue we notified them.

The Witness: Prior to receiving the notice, since 1910, we have made about twenty thousand tons of this spiral reinforcing, and prior to that about ten thousand tons. The largest T bars we have ever used would be a trifle over three-sixteenths of a square inch in sectional area, before the rectangular cuts were made in the bar.

(Pages omitted in narrative reduction.)

(Testimony of Julius Kahn.)

CROSS EXAMINATION BY MR. GRIFFIN:

Our standard practice is to use bars three sixteenths of an inch in area. The Monolith Company used flat spiral bands. I don't distinguish between a flat band and spirals. It makes no difference in the engineering profession at all. It may have circular flat bands instead of continuous spirals. In connection with the Monolith bar, spirals were used. They took the bar and rolled it up like this. This bar is rolled. Now they inserted into this kerf here a small bar. Then by means of a press operation they rolled that around, and that clinched that wire there. Now for a hoop column, they used little wires and they allowed them to stick out, and they inserted the spiral into the little wires and clinched the wires over by means of a hammer. There were no means integral to the bar for securing the bars to the spiral or the spirals to the longitudinals.

Mr. Guthrie: I offer in evidence extracts from the Engineering News, appearing on pages 137, 327, and 392 of the record of the Pittsburgh case, with index of exhibits showing date, where they do not appear on the exhibits themselves.

Marked Defendant's Exhibit No. 6.

Defendant Rested.

(Pages omitted in narrative reduction.)

(Testimony of George E. Vandenburgh.)

Thereupon further to maintain the issues upon his part, plaintiff was called as a witness.

GEORGE E. VANDENBURGH

testified as follows:

DIRECT EXAMINATION BY MR. GRIFFIN:

In the Kahn bars that I have used for beam construction, the prongs were set according to the thickness of the girder or floor arch. The angle was dependent upon the thickness of the floor or the depth of the beam. I have had considerable experience, not wholly in the concrete business, but in several jobs through the country, some in California, one in Philadelphia, and several in Washington. Prior to the reissuance of my patent I tried to get it into the harbor business in San Francisco, and into the harbor business in San Pedro, but the steel companies there could not manufacture steel that would stand the pressure; they could not come up to five thousand pounds of the pressure required in the specifications to make it, so that we could not get any to do any business. I never intended this reinforcing for any particular style, just wherever an even spacing was required. The principle of it was to get the even spacing for the strain, in laying the concrete into the work, so that the wire can not slide. The sliding of the wire is what caused failure in concrete.

Q102. In your reinforcement were the spirals rigidly or flexibly connected with the coils?

(Testimony of George E. Vandenburgh.)

Mr. Guthrie: We object to the question for the reason that it is immaterial anl irrelevant.

The Court: Whether rigidly or flexibly connected?

Mr. Guthrie: The original patent in the claims said "rigidly attached." In the reissue it said "Permanently attached." And it was contended that "permanently" meant it would not fall out, and therefore he meant it could be collapsible.

The Court: I will hear his testimony.

A. The earliest ones I made never could be held out without wiring. They had to be held up, they collapsed. I have a bar that shows the first device I ever made, and shows that with the wire pulled out, they always collapsed. It is not possible to get a spacing bar to bind spirals such as are used in this case rigidly.

Q105. If the prongs were pounded down upon the spirals tight enough would that produce a rigid connection?

A. That depends on the hardness of the steel. If one steel is harder than another, it will close to a certain extent. If your wire is harder than your bar, it will spread up, widen out.

The Court: Why, if you hammered the spur, or what you call the kerf, down over the spiral, why wouldn't that be a permanent fixture or rigid fixture?

The Witness: It would be so hard before you could close it down. I have never been able to do it.

(Testimony of George E. Vandenburgh.)

There is one I pounded on a straight bar, pounded it down as far as I could. (indicating to Court)

The Court: This doesn't come out.

The Witness: They don't come out. They are not supposed to come out, but they collapse them.

Mr. Griffin: There is a difference between rigidly connected and permanently connected. We contend it is a mere permanent connection which is intended in the specifications, but through inadvertence the wrong word was put in the claim issued and the reissue patent was to correct that defect.

The Court: How do you mean collapse?

The Witness: Just like this (indicating).

The Court: If you used two spacing rods, how would you do that?

The Witness: It would collapse if one is put with the other. During the years following the grant of my original patent, my financial condition was bad. I have had about six bad falls, through building, and at that time I had had a bad fall. I am bandaged now; I carry a bandage on there all the time; and then I had lost money in the bank failure in San Francisco, the California Safe Deposit Company, and I had been out of work a great deal, work had gotten very slack after the earthquake for a couple of years, and I would work along until I got money and then stop and try to do something with the patent, but the bricklayers were against me. I am a bricklayer by trade, and belong to the union, and they were against me because I was trying to introduce concrete reinforcing on the market, and at that time

(Testimony of George E. Vandenburgh.)

they would not allow anything like that to go on a building. It would have to go on separate and not reinforced. Everything would have to be fabricated on the job, and the bars shipped separate and the coils shipped separate. All those things prevented me from exploiting my patent. I didn't have any money to work on. Had no intention of defrauding anyone.

Q110. Where did you first make this invention?

A. In Washington, D. C.

Mr. Guthrie: We object to that as calling for the opinion and conclusion of the witness.

The Court: Haven't you asked him that on the stand before?

Mr. Griffin: He answered the year as 1903, and I wish to ask him what he did to develop it.

A. In February 1903 I made models, six or seven different models. Some were first made up of wood and wire, and then I cut them out of steel and wire. Then I couldn't go on because my mother died and I had to bury her, and I had that expense, and then I got married and I had a great deal of expense going housekeeping, and then my wife's mother, I had to give her a monthly allowance. It seems funny, but I had something on my hands all the time. The models were the same as the drawing in the patent.

Mr. Guthrie: We move to strike out the answer as not a sufficient standard of proof for anticipation.

The Court: Your motion will be overruled, and I can take care of it just as well when I am disposing of the case.

(Testimony of George E. Vandenburgh.)

A. I fixed the date of the making of the models from living at 1803 Oregon Avenue. I rented a room with B. Blethyn, where I made my home. I rented it in April and I lived there and I made those models in his shop before I left his home. When I went to California, I left all the models in his place and I didn't take any models with me.

Q117. Did you ever test the models of your reinforcement?

A. I did in June, 1906 on the Government reservation at the New Freedman Hospital building, Washington, D. C. A breaking test on the floor slab and girder. This test was made on a government reservation and they would not allow me to dig down to put a column in and I couldn't do it above the ground on account of too much danger to the people, and they wouldn't allow me to test that. The Government inspector was there and I had to abide by his decisions. We invited a large crowd of people out to see the test; it was public.

Q122. Is it practicable to use a flat bar with prongs on the flat side of the bar for connecting to the spirals without a radially extending member for holding the spiral in proper position?

Mr. Guthrie: I want to formally object. This gentleman has not shown himself qualified as an expert.

Objection overruled.

A. It is not. It would be too much danger of buckling. You understand, you take that bar and put it out here, and if you had a quarter of an inch

(Testimony of George E. Vandenburgh.)
thick, you would have a quarter of an inch, but where you put it edgewise this way, the buckling out would not get it.

(Pages omitted in narrative reduction.)

(Testimony of Benjamin Blethyn.)

Thereupon plaintiff called as a witness

BENJAMIN BLETHYN

who, being first duly sworn, testified as follows:

DIRECT EXAMINATION BY MR. GRIFFIN:

My name is Benjamin Blethyn. I am a builder; was engaged for the last 36 years in Washington, D. C. I have put up reinforced and almost all kinds of store buildings or anything that comes along. I first knew Mr. Vandenburgh about thirty years ago in Washington, D. C. I saw him working on spiral concrete reinforcing in my shop in 1903. He was making them out of wood there to start with. He made five or six or probably more until he got it satisfactory.

Q12. Will you describe the character of concrete reinforcing that Mr. Vandenburgh was working upon in 1903?

A. It was more of a spiral construction.

Q13. Will you describe it fully?

A. First of all he made it out of wood and then that was intertwined with wire. He started to looping the wire, and then bored the holes in the rod to make it stay where he wanted it. He worked on several different forms until he got it satisfactory, and then he made it out of steel.

Q. I want you to describe it, particularly the bar reinforcing.

A. As near as I can. There were some girders and some columns. He had spirals and flanges in

(Testimony of Benjamin Blethyn.)

the beams so they would hold the spirals in place.

Q. What held the spirals in place?

A. The wire. He had holes in the wood, and he had little spurs to hold the wire until he would get it to the pitch.

Q. You were speaking of his having made it in steel?

A. He had the prongs and clinched them down. He bored a hole and put them through the slots and then clinched the slots to hold the wire. The prongs were upon the bars.

Q18. I will now show you a copy of plaintiff's reissue patent, "Exhibit No. 1" and ask you if you can identify any of the models then made with the drawings illustrated in the patent?

Objection overruled.

A. Yes sir; I can recognize them all.

Q. Did you ever make a test of the Vandenburgh reinforcing?

A. Yes sir, in the Freedman Hospital grounds. It is a Government reservation. In making that test I got all the appliances for making the test, the weights and all the facilities to do the work. I sent out 300 cards to Government officials, leading builders and architects in Washington.

Q. I will show you a card and ask you if you recognize that?

A. That is my handwriting, "June 23, 1906." I had that card printed in Washington and sent it out to Mr. Vandenburgh's father in Ballston Spa, New York. The date is June 23, 1906.

Mr. Griffin: This postal card, addressed to Mr.

(Testimony of Benjamin Blethyn.)

John M. Vandenburgh, 122 Saratoga Avenue, Ballston Spa, New York, bearing postoffice date of Washington, D. C., June 23, 1906, and also Ballston Spa postoffice, evidently June 23, 1906, and upon the reverse side reading as follows: "Washington, D. C. Sir: You are invited to be present at the New Freedman's Hospital Building, Monday June 25th, 1906, at 3 o'clock p. m. to witness a Crushing Test of the Vandenburgh Reinforced Concrete System, to be made by the Computing Engineers of the Building Department. Respectfully, Benjamin Blethyn."

I will ask to have it offered in evidence and marked "Plaintiff's Exhibit 6."

Q. What did you have at that place—what construction did you have to test?

A. Well, it was steel plates from the Metropolitan. They had plates that weighed 150 pounds each, and I was acquainted with the president of that company, and he allowed me to get as many plates as I wanted to be used as weights.

The constructions that were crushed were the girder and the platform. We made a platform, 10 feet by 14, and the girder was ten or twelve by eight. I think eight by twelve, and I think the platform was ten by fourteen, six inches thick. We made the girder right on the place. I have the steel today, most all of it. I have one or two bars that got crushed at the time.

Q29. I will show you a bar with four notches in it, and ask you if you recognize it?

A. Yes sir; that is the original bar, one of them. I

(Testimony of Benjamin Blethyn.)

had it in my shop in my warehouse. Mr. Vandenburgh just cut it to suit the suitcase. That is, two of them. I can furnish them fourteen feet long today. I think probably I have eight or ten of them. They are still there today.

The bar was offered in evidence and marked Plaintiff's Exhibit 7.

As a practical builder I could take the construction shown in the Vandenburgh patent and produce satisfactory buildings of different sizes and for different loads. The New York building code says with respect to such fastening of the spirals to the longitudinals that bars be not less than four fastened with a clasp; something of this order. The wording used in connection with it is that it has got to be a rigid reinforced bar.

(Testimony of Benjamin Blethyn.)

CROSS EXAMINATION BY MR. GUTHRIE:

Q39. Suppose you wanted to build a beam to support a floor area with a dead load of from 50 pounds to the square foot, to a live load carrying capacity of 150 pounds to the square foot. How much steel and how much concrete would you use under this construction, and how would you use it?

Mr. Griffin: I object to the question as calling for an answer from the witness without certain data supplied him as would be necessary to have him give an answer.

A. It takes an engineer to do that kind of work and I don't claim to be an engineer.

The Court: The only factor that seems to be missing is the size of the floor. If you could give him the size of the floor—

Mr. Guthrie: They have admitted he can not do it; that it is an engineer's job.

The Court: You are not an engineer?

The Witness: I do not claim to be. I am a practical builder. If an engineer designs what he wants I can build it. I can tell how much steel to use, what kind anl how close to put it together. I have had experience enough to do that.

XQ43. We will assume a school room floor. The floor is supported upon a brick wall, brick foundation wall, the floor inside the walls is 40 x 90 feet. They want a live load carrying capacity for the children and desks, and so on, in the school room of 150 pounds for the square foot. Now, you can design the beams

(Testimony of Benjamin Blethyn.)

and girders and concrete construction any way you please; just give us any design that would meet that carrying capacity and not exceed it substantially so as to have a waste of material. I turn you loose to figure it any way you like.

A. All right. (Witness figures) It requires for girders for a room of that size—

XQ44. First, what is the size of the girders?

A. The girders will be twelve inches by thirty inches deep, forty foot long. It requires 1-1/4 inch rods at the bottom and two on the top, and above the platform they will have to be about every 16 feet apart. The girders will have to be about 16 feet apart, and the platform will have to be 5/8 rods, 6 inches on centers, and 6 inches thick. I have already constructed a building of that size and just about that dimension, and it is up today and satisfactory and passed all the building requirements. That is what they call the Bristol School today. It is a four-story structure. I designed it. I was architect to the whole job. Between the time that Mr. Vandenburgh made his models and the time of the test he worked with me several times. He was working at his trade and he was in very poor health at the time. He wasn't working all the time.

XQ48. What led you to make this test in 1906?

A. Because that is the time he had it perfected and he had been down south and probably had improved his health and wanted to go ahead. I don't say he had it perfected, but that is the time he had his money. He had it perfected in 1903. Pretty

(Testimony of Benjamin Blethyn.)

near all of it; what I have seen. I could tell anybody, as far as that goes; it is the beams on the columns.

XQ53. What part of the beam did he have perfected—what brought it to perfection?

A. His own way of working. I had nothing to do with the working of it, only he was trying to work it out in my shop. He told me it was all right and he was going to test it out.

XQ55. He didn't test it for three years?

A. That is his own business; not mine. I had nothing to do with that.

XQ56. This piece of steel marked "Plaintiff's Exhibit 7," that, you say, was cut off a rod 14 feet long, and used in this test in the Freedman Hospital grounds?

A. Yes I swear to it and the wires were about the size of the holes that are in the bar. I used plain bars but not everybody did. There were diffeerent kinds of construction.

XQ62. There were very few people that used these fancy contraptions with the slots on the main bar?

A. Very little was known of concrete reinforcement at that time. The main bar and the reinforcing wire was depended on as much as anything else. The reinforcing wires and main bar are not so much out of proportion.

XQ66. The wires weren't any larger than would go through these little holes?

A. In Defendant's Exhibit, Picture here, Figure 1, you see the loops inclined in one direction on one

(Testimony of Benjamin Blethyn.)

side of the center, straight up and down in the center, and then in the other direction at the other end of the center. Now this bar that was cut off, had these little slots in the bottom for the wires running in one direction on one side of the center about seven feet, and in the other direction on the other side of the center for about seven feet. Where he had it doubled, he has the wire a little smaller for the double wire. Two wires in the same loop in which event he used smaller wires. Not all of Vandenburgh's models had the kerfs cut in them running in one direction on one side of the center and the other direction on the other side of the center. The columns didn't have to have that only the beams.

XQ72. Where did you see him put up the columns?

A. I seen him put them up.

XQ73. You saw this up?

A. I didn't see them.

XQ74. You don't mean to say he had a column up out there?

A. I didn't see him make any test of any columns, but I see him make a test of that floor construction and the girder. A computing engineer is a building inspector and computing engineer on the building. He has to pass over the plans for the strength and construction of different buildings. He was the highest one we could get to come and make an examination and give the test. He came out there voluntarily to make the test. We put the weights on it, and he had the weights, different weights checked which

(Testimony of Benjamin Blethyn.)
were used to make the crush and he helped the other men. I had three or four of my own men there besides.

(Pages omitted in narrative reduction.)

(Testimony of Benjamin Blethyn.)

REDIRECT EXAMINATION BY MR. GRIFFIN:

The engineer made some observations at the time of the test. He had his instruments and data of the weight, and when it was broken; he had all of that.

Referring to Plaintiff's Exhibit 4 and the hooping of the column that says three-sixteenths as the size of the hooping, I have never seen any as small as that. I have seen them from three-eighths up to half an inch. Three-sixteenths is rather too small, you couldn't get enough strength out of three-sixteenths.

(Testimony of F. E. Turneaure.)

PROF. F. E. TURNEAURE

recalled, whereupon Mr. Griffin admitted upon a question by Mr. Guthrie that the device known as a kerf in a longitudinal member for the purpose of attaching a transverse member by embedment in the kerf was in common use in the middle west.

Thereupon it was stipulated that the testimony of Professor Thayer could be taken before the stenographer on the day following the trial, and his testimony received the same as if taken in open court.

Thereupon plaintiff called

HORACE R. THAYER

who, being first duly sworn, testified as follows:

DIRECT EXAMINATION BY MR. GRIFFIN:

My name is Horace R. Thayer; age 47; residence, Pittsburgh. I am a professor of structural engineering and also a civil engineer. Was engaged in it for thirty years. I have worked at it and studied it and taught it for thirty years, mainly in New England and Pittsburgh. I am at present with the Carnegie Institute of Technology, having been there fourteen years as a teacher of civil engineering anl structural engineering. I have appeared before in the litigation of the Vandenburgh patent in Pittsburgh in the case against the Electric Welding Company. I have recently examined that record and do not consider that my testimony in that case needs essential

(Testimony of Horace R. Thayer.)

modification. I notice one or two small errors in transcribing my testimony. They would not materially affect the conclusions.

I have examined the art and models made of record in that case, but did not find in that record or in the models made of record in that case any instance of spirals used in connection with longitudinal spacing bars having means integral with the spacing bars for securing the spirals in fixed positions, prior to the original patent. I have examined the patents offered in evidence in this case with the idea that those I had already seen in the Electric Welding Company case I had seen before, and those that were new I examined more carefully. I did not find any samples of spirals secured to longitudinals by means integral with the longitudinals, prior to the original patent.

The building laws of New York and Pittsburgh say as to the use of spirals that the connection of the spirals with the longitudinals must be rigid. There is a building now going up on Second Avenue near the Pennsylvania Railroad using the Kahn system in Pittsburgh.

Mr. Guthrie: We object to this testimony on the theory that if it indicates anything as to the rigidity or otherwise of the defendant's present structure, it is incompetent for that purpose. The building laws of Pittsburgh may or may not be enforced or may or may not be evaded.

Q22. Do you know of any instance in the City of New York of Truscon spirals being used?

(Testimony of Horace R. Thayer.)

A. No, I do not. Examining plaintiff's reissued patent I regarded Figure 4 as collapsible. I would think that all cases that would be likely to occur in practice, that is, with bars of the sizes that would be built in practice, would be collapsible if built of that type. You might get an extraordinary case where they would not be. In connection with ordinary concrete reinforcing it would be collapsible. I have seen as exhibited in Plaintiff's Exhibit No. 2, the construction differs from plaintiff's figure 4 only in very small details. The plaintiff shows a rectangular bar and defendant shows a T bar. It is only the minor details.

The fastening of the spirals to the bar in each case, is done in the same way by prongs which can be pounded down on the spirals that is, by means of prongs integral with the bar itself. It is the same general type of connection. In one case, the case of the Truscon, it goes in perpendicularly, and in the case of the Vandenburgh it goes in diagonally, at least as is shown in this drawing. Each one fastens to every spiral. I take it the bar is fastened to every spiral; each coil wherever the spiral crosses the longitudinal bar, it is fastened on this. It shows two prongs. As an engineering proposition it is the same. There is no essential difference.

Q34. What special advantages does the spiral reinforcing with securing prongs integral with the longitudinals have?

A. It has two very great advantages—the collapsibility of the column for shipping.

(Testimony of Horace R. Thayer.)

Q35. Prior to the placing of concrete?

A. Prior to the placing of the concrete, and the fact that it holds it in position, in its proper position as the concrete is being placed. These spirals—regarding them first—these spirals are bulky and of some small weight under ordinary conditions. As a consequence, it is very expensive to ship them in carload lots. On the other hand, it is much more economical to make them and put them up in the shop, and therefore it becomes a matter of considerable economy to be able to ship them collapsed. In regard to holding them rigidly in position, that is an extremely important point. Engineers dread something that they can not depend upon, and when the concrete is poured—you understand how this is made, they put a form around all of this and then the concrete is poured down and the man stands perhaps ten feet above this and he pours the concrete down in there and perhaps tamps it in to get it thoroughly packed around the column. Now, if this fastening is not rigid, it is very likely to be displaced, and if for any reason this bar were pushed down right up against this bar in here (indicating) we would have a space there six inches wide and it would be exactly the same as if these bars were only spaced every six inches, because that one weak point would limit the strength of the column.

Q36. You mean rigid with respect to the longitudinal movement?

A. With respect to longitudinal movement, yes, and also the same is true in regard to movement in

(Testimony of Horace R. Thayer.)

this direction (indicating) laterally, because, too, that is extremely important. We put about one and one-half inches of concrete outside of that. Now, when this was tested, that concrete scales off under a comparatively light load, the outside concrete. The remainder stays in and is the real working strength of the material. Now, if for any reason these get displaced laterally, it would also seriously affect the strength of the column, and engineers are very, very distrustful of anything that can be changed without their knowing it. This is one disadvantage of reinforced concrete. The reinforcement in the concrete is liable to be displaced by the ordinary operations of pouring and placing and tamping the concrete, and they want something they can rely on, just the same as if you were going to do business with a bank you would want a bank that you knew was on a firm basis. You want to put concrete and steel together and you want to be sure that the steel will remain in the place where it is intended.

Q37. Have you made any examination of the later art than the Vandenburgh patent to see if there are many patents on spirals with spacing bars having integral securing means?

A. Yes sir; there are several at least.

Q38. Without offering these patents in the record, can you give their dates and the number and name of the patentee?

A. To E. R. McClure, No. 992,970, May 23, 1911, No. 1,016,319 to W. H. Burk, February 6, 1912, to A. Bindley and C. J. Mogan, No. 1,115,490, Novem-

(Testimony of Horace R. Thayer.)

ber 3, 1914, No. 1,159,297, to C. A. P. Turner, November 2, 1915, to W. B. Hough, No. 1,172,026, February 15, 1916.

Q39. Have the spirals in which integral fasteners are used on the spacers more or less supplanted other forms?

A. Yes, I think they are the more desirable type. I could not say definitely what proportion of spirals is used with the integral fastening means in the buildings I have recently noticed. I know it is a better type of construction. There are more of these used than the others I think. I examined Plaintiff's Exhibit patent two years ago and regarded his disclosures and that of his original patent as sufficient to enable any mechanic familiar with this art to make satisfactory columns or other reinforcing, provided he was already familiar with the theory of reinforced concrete columns. That is, the theory of making the steel sizes of the proper size to carry any given load. The size of the steel and the pitch of the coils in any given case is determined from rules that have been worked out by prominent engineers, those rules being derived as the result of experiments.

Q46. What have you to say with regard to properly securing all of the spirals in a large sized building by other methods than the integral securing means?

A. Well, I should object to it unless it was such as to hold them rigidly in position. I mean by "rigidly" securely in position. Engineers generally

(Testimony of Horace R. Thayer.)

take the stand that it is up to the contractor to provide work that has proper qualities. They do not usually insist on certain definite things being done. It is a very great advantage. I would object to a column where that was not done because, as I just pointed out, the spiral that was not secured might readily be displaced from its proper position and weaken the column to just that extent. There is no other method that I know of of securing the spiral to the longitudinal that makes as good and efficient a job as the integral securing means. I have compared the mechanical structures of the Concrete Steel record with those of the Electric Weld record.

Q52. Did you critically examine the several patents of the Concrete Steel record and the Electric Welding Company record and compare the patents submitted in each record with each other?

A. Yes. I went over the Steel record, and where the patent was a new one, I looked at it critically. Where it was an old one that I had been over in the other record, I just passed it over. My recollection is that there were a few of the Concrete Steel record that were not in the Electric Welding record.

Mr. Guthrie: We may as well agree there were only two of them, Maxwell, No. 859312 and Barnes, No. 868065 that were not used in the Electric Welding Company case and were used in the Concrete Steel case.

Q56. As a result of your examination of the references in the two records, do you or do you not think that the Concrete Steel record has exemplifications

(Testimony of Horace R. Thayer.)

of substantially all of the means of securing spirals to longitudinals shown in the Electric Welding Company record?

Mr. Guthrie: The same objection. It is too general, even for an expert.

Mr. Griffin: I will waive that question for a moment.

Q57. Have you examined all of the patents in the Electric Welding Company record?

A. Yes sir.

Q58. Have you examined all of the patents in the Concrete Steel record?

A. Yes sir.

Q59. I will now ask the first question.

Mr. Guthrie: I renew the objection.

A. Yes I think it has.

(Pages omitted in narrative reduction.)

(Testimony of Horace R. Thayer.)

CROSS EXAMINATION BY MR. GUTHRIE:

XQ60. Where do you find in the New York record an exemplification of the means of attachment of coils shown in the Monolith Construction design shown on page 392 of the Pittsburgh record?

Mr. Griffin: The question is objected to as upon an example of concrete reinforcement bearing a date too late to be a reference against this patent, the date of said article in the "Engineering News" being March 15, 1906, whereas the original patent application was filed May 9, 1906, and to be effective as a reference against this patent, such disclosure must be two years prior to May 9, 1906.

Mr. Guthrie: We take exception to counsel's theory of the law. We can not understand how a man can be the first inventor of something that has been invented even the day before.

A. I looked over the two records and compared them in all cases solely with one idea in view, and that was in regard to the attachment of a spiral by integral means to a vertical reinforcing bar and especially in regard to reinforced concrete. Now then, I found in the New York case substantially the same general line of attack as in the Pittsburgh record, but I could not say that in some little details it was not a trifle different, especially where it did not concern this question. I have looked over these forty or fifty patents solely with that one thing in view, and outside of that I have not paid very much attention to them, outside of the questions we are contending. Perhaps I ought to qualify the answer to the question you asked me at the time when you

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asked me about that record. I went over all the new patents that were brought out in the New York trial. I did not pay any attention to the old ones that were duplicated, because I had seen them already. I was going over it for new matter and I did not pay attention to whether all the old matter was in, but I simply thought they were about the same as had been brough into the Pittsburgh case.

Q. You have testified, in answer to Mr. Griffin's question that you found in the New York record an exemplification of every means of attachment of the transverse members of the longitudinals found in the Pittsburgh record. Now, proceeding, will you kindly call my attention to where in the New York record you find an exemplification of the means of attachment shown in the Cummings patent of 1904, on page 157 of the Pittsburgh record, particularly figure 1, where the transverse members are held in place along the longitudinals by constituting the longitudinals of two units woven together so as to form a single longitudinal embracing integrally the bands at the points of connection.

Mr. Griffin: The question is objected to as immaterial and irrelevant, upon the ground that the patent referred to has no spiral reinforcement whatever, and that my question related to spiral reinforcement connections with longitudinals.

A. You get something of that idea in the Cummings patent, page 90, and also in the Peabody patent. It is not exactly the same, where the rod is wound around. It is not interlaced wire of the same

(Testimony of Horace R. Thayer.)

kind. But there is something of the same idea there and the same idea there (indicating on exhibit).

Q. That is, your idea is that the Peabody patent No. 805,663, shown on page 78 of the New York record, and on page 317 of the Pittsburgh record, is, from an engineering standpoint, substantially the same as the Cummings attachment in figure 1 of No. 764,883, shown on page 157 of the Pittsburgh record.

A. Oh, no, I didn't say that. My statement was that the general line of patents shown in the New York record was somewhat similar to the line of patents shown in the Pittsburgh record, and that I examined particularly the new ones, to see how they concerned this particular patent upon which we are contesting.

Q. You must have been careless then in your answer to Mr. Griffin's question, for in answer to his question, upon which I am now cross examining you, you testified that you found in the New York record an exemplification of everything shown in the Pittsburgh record, and the question I am now seeking to get an answer from you upon is where you find in the New York record an exemplification of the method of attachment shown in the Cummings patent on page 157 of the Pittsburgh record? Where do you find it?

A. I find it here. That is, in general; not exactly the same, but the general line of attachment, yes sir. Figure 7 only. I would say figure 7 of the Cummings patent No. 822587 on page 90 of the New York record and on page 167 of the Pittsburgh record I

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would say the same about that is I did about the other, that it is a type of a somewhat similar connection, namely, an attachment of the verticals by means of wire. It is not the same idea. If it was, you ought not to be able to patent it. It is a different patent.

I testified in the Pittsburgh case and have recently read my testimony in that case carefully. I found, I think, two mistakes in it.

Q. Now, the fundamental function of a proposition in column hooping construction, whether you use bands or a continuous coil, that is, a coil continuous in the direction of the spiral, is that the attachment shall be such so loose at the point of attachment, that the material can be fabricated, complete in the factory, and collapsed for economy of space in transportation, and then on the job restored to its form without substantial distortion of its form as originally produced in the factory, and with the bands or spirals, as the case may be, held in position so as to prevent substantial displacement, either longitudinally or laterally, during the course of pouring and ramming the concrete.

A. Yes sir. After the concrete is poured and is set, the concrete itself holds everything in position, and when the column is put under the compression strain of the load, the bands or coils resist the tendency to expand or diagonally shear or spawl off.

Q. While it would involve more trouble and work in the factory, being more expensive commercially, the use of an independent clip fastened around the

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column itself and then fastened around the coil or band sufficient to hold it,—as you use the term "rigidly" rigidly against longitudinal or lateral displacement to a substantial degree, would achieve the same functional purpose, would it not?

A. How would you do it?

Q. For instance, if it was done as is suggested by the clip method of attachment shown in figures 4, 5 and 6 of the Swiss patent to Mollins, 1903, shown on page 276 of the Pittsburgh record, such an attachment being of sufficient strength would accomplish the same functional purpose, would it not?

A. I would be afraid that it would be rammed down during construction. You understand that the workmen that handle this do not always handle it very carefully, and I do not see anything at all to prevent that clip being forced down to some extent by the process of depositing the concrete. You see there is nothing that holds that bar in position vertically but the friction between the two iron surfaces, and I doubt if that would be sufficient to keep it in place during the tamping of the concrete.

Q. Turning to figures 6, and 7 of the Cummings patent of 1906, shown on page 171 of the Pittsburgh record, where certain prongs of the clip are fastened independently to longitudinals and other prongs of the clip are used to embrace the coil or band. If those clips were fastened to the longitudinals sufficiently tight, they would hold the thing in place, would they not?

A. Well, if I was putting up a building myself,

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and I would be responsible for the safety of the folks that were in it, I would prefer not to use something that might be safe but something you would know when you put it in the concrete would stay there. None of these devices would be perfectly safe if there was carelessness in using them. The device of the prong and the cut in the spacing bars is about as fool-proof as you can get it. As a means of attachment I consider it perfect.

Q. Now in the art of column hooping long prior to the Vandenburgh patent there were disclosed a great variety of means of attachment, were there not?

Mr. Griffin: I object to the question unless it is shown definitely what counsel has in mind and what he refers to. The question is entirely too general and is irrelevant and immaterial.

(Question is repeated.)

Mr. Griffin: The question is further objected to on the grounds that it is not at all definite as to time.

A. I would not use the term "great variety." There was some variety. You understand that this patent came almost at the beginning of reinforced concrete construction; that in those days they did not take it up as much as they do now, and perhaps you might call 1900 the beginning practically of reinforced concrete construction. I would not say that there is a "great variety." There is some variety.

Q. Well, let the patents speak for themselves. Without regard to the patents particularly pertaining to column hooping as an entirely independent

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proposition, it was old at that time in metal working and engineering, wherever you had occasion to connect a transverse and a longitudinal member to connect it by tying it with wire, using a clip, using double interlaced longitudinals, so as to embrace the transverse members in the twisting of the longitudinals, as in the weaving of wire mesh, and wire cloth, and that sort of thing, or by welding or riveting, or by integral prongs or tongues punched out of a metal member, a longitudinal, or by cutting diagonal cuts into the longitudinal in some places, or by cutting right angle cuts into the diagonal and longitudinal and so forth, and for the engineer who was designing any particular thing for the purpose he had in view to adopt any particular one of those devices which he might consider the most desirable from a commercial standpoint, the expense of production, the convenience in assembly in the factory and field, the transportation, the rigidity that he desired to attain, etc., and to select such of those means as he preferred, was it not?

Mr. Griffin: The question is objected to as vague, too general and not referring to any issue offered under claims 1 and 3 in issue herein, and as being irrelevant and incompetent.

A. The methods were known that you speak of. Whether the engineer had a right to use them or whether they were available to be patented for specific cases is a question of law and I do not feel competent to answer.

Q. If you were an engineer and designing some-

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thing without regard to any patent law, you would select and use the one that appealed to you most from the standpoint of the problems you had before you, would you not?

A. But we engineers have to look out for patents just the same.

Q. You answer my question.

A. I am answering your question.

Q. No sir. I did not ask you to determine whether or not engineers must look out for patents. I asked you, assuming that there was no patent question involved. You can take that assumption for the purpose of your answer.

A. But we have to look out for patents. That is our instructions in specific cases.

Q. All right. You answer my question. Assuming that you did not have to look out for patents, then you could have selected any one of these that your judgment preferred?

A. Yes sir. That is we would pick out the one that was most suitable. In answer to a series of questions as to specific disclosures of Hyatt patent, witness agrees that, the Hyatt patent shown on page 189 of the Pittsburgh record shows a construction in figure 1 of spirals continuous in one direction with another set of spirals continuous in the other direction, from end to end, the spirals interlaced. In figure 4 he shows the use of a single spiral supported on a single longitudinal, and in figure 5 shows the adaptation of this construction to a solid column.

He says reading from printed page 191 of the

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Pittsburgh record "According to another plan I wind the metal strip or strips around a mandril, and make thus a long spiral closely or loosely coiled and of the length desired. To this coil I attach a tie properly fastened, and I then fill and overlay it with cement, concrete or their equivalents." He contemplates a continuous spiral closely or widely disposed as the engineer prefers. The spirals are to be held in position during the period of applying the concrete by a tie to which the coil is to be properly fastened.

Q. When he says "properly fastened" he means for the one who is making the construction to use such method of fastening as the constructor prefers, does he not, leaving it to his judgment?

Mr. Griffin: The question is objected to as the patent speaks for itself and no interpretation of it by this witness is necessary or required.

A. You will notice farther on in that same paragraph he says "beam." He applies this to a beam. Now, then, for a beam a proper fastening would not necessarily be an integral fastening. Most of those fastenings in practice are put in loose or just lightly wired. This question of properly fastened in this case would mean a lightly wired fastening. I don't see that has any bearing on this.

Q. Suppose the constructor preferred to rivet it on, would not the patent cover that?

A. I would not say that riveting was a proper fastening in that particular case. It is too expensive from a commercial aspect. The questions of ex-

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pense, convenience and function to be attained in each case control an engineer free to make a choice in the adoption of a particular choice. The virtue of the integral method of fastening spirals is its commercial possibilities, its ease of being shipped, to enable it to collapse, but it is rigid when they put it in the concrete and it is that wonderful practical part of it that makes this question worth fighting about.

Q. You consider you are engaged in a fight, do you? Answer the question.

A. This is a lawsuit. I would not consider riveting a proper method of attachment. It is too expensive and it weakens. Such a large proportion of the spiral is lost by the riveting. You take it in a three inch bar with three-quarter inch rivets, over 25% is lost by riveting, and it is that, together with the cost of the riveting, and the fact that if it is done in the field, it is done at a very large expense, and if it is done in the shop, it can not be collapsed for shipment ordinarily. Those two factors would prevent its commercial practicability.

Page 207 of the Pittsburgh record of Hyatt says in the final specifications "The tie c may be riveted, or otherwise attached to the metal sk.lton, as shown, and is preferably placed well up in the concrete to be out of the way of flame in case of being attacked by fire." I take it riveting has been used, but that system has not proven commercially able to compete with other systems. Hyatt evidently contemplated

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rivetting as one form of attaching his embracing spiral to his spacing tie.

Q. And would you not understand when he says it may be riveted or otherwise attached to the metal skeleton, that he meant that anybody constructing if they preferred not to rivet it for any reason, could attach it by any other means that were known in the art.

Mr. Griffin: The question is objected to as the patent speaks for itself and requires no interpretation on the part of this witness.

A. I will answer it as I did before, that he contemplated this for beam work, and for beam work wiring would be the proper method of attachment. Hyatt meant that he thought that a riveting attachment was the best way but that he left it open to attach the spiral to the tie in such a manner as the particular constructor preferred to select from the means available in the arts.

Q. Now, then, bearing that statement in mind, would you say that under the contemplation of Hyatt, and assuming that the method of attaching diagonals to longitudinals shown in the arts at the time of Hyatt then included the method of attachment shown by Norwood on page 282 of the Pittsburgh record, patent No. 571,575, is there any reason why a particular constructor, having the Hyatt patent before him, and preferring to select what he considered a proper method of attachment, or some attachment otherwise than riveting, would have had any difficulty in using the method of attachment

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shown in the Norwood patent? Of course, I understand that Norwood was not known at the time of Hyatt, but assuming that it was known at that time, would there have been any difficulty.

Mr. Griffin: The question is objected to as not directed to any issue of this case, and combination claims cannot be anticipated piece-meal.

Q. That is another question of law. We want the professor's opinion as a practical man, not as a lawyer.

A. It would not be practicable to connect the bar shown on page 218 of Hyatt's patent by the manner shown on page 282. It would be difficult to punch out. You could not punch out from a bar those holes, and unless you would punch them out it would be so expensive to drill them that the cost would be prohibitive. And furthermore, by the time you had punched out the holes for your tension bar, you would not have any strength left in it worth mentioning. No, it would not be a practicable method at all.

Referring to the tension bar page 218 Figure 2 and figure 4 of Hyatt is the same thing. That is, you see the hole would come right through there (indicating on patent) and the strength of your tension bar would be entirely gone. It would not be a practicable method at all. You would have to punch out the hole right through there (indicating on patent) and the hole would be so big that it would take up all the strength of your bar. Referring to figures 4 and 5 of Hyatt and considering the size of spiral there shown.

(Testimony of Horace R. Thayer.)

Q. Related to the size of the longitudinal or what he calls the tie c there shown, you could not punch out in c enough of an opening to hold the spiral a, according to the method of Norwood without destroying the small tie-rod?

A. No. It is evident that the patentee Hyatt never had in mind such means of fastening as you have mentioned. I will repeat what I said before, that for a beam that Hyatt has got his patent on, this method of punching out will be impracticable for the reinforcement shown. It would take away too much of the strength of the member, and he probably did not contemplate it. That is, I should say as an engineer, if he had enginering sense he would not have contemplated the use of the prong in connection with his construction.

Q. Won't you please answer a single question once in a while directly so that I may proceed in a constructive way to the point I want to ultimately reach. Now, won't you please answer this one question—If the proportion, the relative sizes, of the two members shown in Hyatt's Fig. 4 were such that the tie rod c was large enough to afford space without destruction of necessary strength in tension and the spiral A was small enough to be incorporated in such space as might safely be cut out of the longitudinal tie rod, could not an engineer who knew of the Norwood construction, at Page 282, have adapted that to the Hyatt patent if he had so desired?

A. Not to make a practical construction—because it would take away too large a proportion of the ten-

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sile strength of the member C which is relied on to carry the stresses. The proportion lost is too large to make it practicable. It would not be practicable if the members are altered in size as you suggest. I think I read Considere several years ago. I do not remember any disagreements with his conclusions. His record has been accepted as very valuable. I am familiar with the works of Prof. Hool—also with the books of Thompson & Taylor and Turneaure & Maurer. They are the three leading works on this subject. Prof. Turneaure stands very high in the profession. I do not know how much practical experience he has, but in the matter of testing and theoretical work I should judge from his book that he has not had much practical experience. He is very high theoretically. I would say he is among the best.

Q. Now in this matter of column hooping, the functions in column hooping construction, the problems to be met and solved are functionally different from those involved in beam construction, I should understand from what you say in reference to Hyatt and his being a beam construction?

A. Yes sir, very different. Nevertheless a beam may be used as a column, but it would not be practicable in most cases—or desirable. If heavy and strong enough it would be practicable excepting from a commercial standpoint. In American practice my recollection is both longitudinal reinforcement and hooping came in together as alternative types, but the hooping was discovered a long time ago and be

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fore concrete came in general use, so that the two came into use sort of together in America. I was not in touch with practical construction at that time, but I take it I have been in touch with the beginnings of reinforced concrete in this country and I know they came in both together. There was a common type where the longitudinal reinforcement was of such area as to itself serve to extend resistance to compression and serve as a member of that kind although its main function is to carry the sidewise bending that occurs when a column is put in action, more particularly a long column. This is accomplished by having oppositely opposed longitudinals near the circumference or corners, if the column is square. They put the reinforcement on the outside of the column. They had opposing longitudinal members which worked one in one direction and another in another.

Q. Would you get any substantial, calculable results in a column of say eighteen inches in diameter by the use of a couple of longitudinals having a sectional area of say three-sixteenths of an inch?

A. It would not amount to very much. It would be small. It would not be worth figuring. Unless they were properly put in position and properly stayed, they would be worthless because they would buckle on a load, probably buckle at a lower load than though it was without. It might really be a detriment. They would serve no substantial function except as a spacer for the spirals. I understand that there is no substanial functional difference in the re-

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sult produced in column hooping between the use of bands or independent loops spaced parallel on the longitudinals, and a coiled spiral similarly spaced, provided the coils of the spiral are sufficiently close together to correspond in the distance between each spiral with the distance between the bands; and if either the bands or the spiral loops are too far apart that the intervening space not protected against expansion provides the same weakness in the column as if some spiral was shoved up. The weakest point determines the strength of the column as a whole. The proper spiral spacing should be about, I should judge, one-sixth of the diameter. A wider spacing than that would not measure up to a practicable and safe device for the purpose. That is the standard. We would allow some variation, but that is the standard engineers have set. One-fourth of the diameter of the spiral would be a little doubtful. One-half would be too much. The concrete would fall off. I think one-fourth would be risky. I would not want to attempt it myself.

Q. Now in discussing this Hyatt patent, and the question of the application of the Norwood method you emphasized the proposition that the application of Norwood to that was impracticable, because the tie rod of Hyatt as compared with the spiral of Hyatt would not permit a sufficiently deep kerf in the tie bar?

A. Yes, but I would say that a design such as Vandenburgh's Fig. 1, showing a spacing between the spirals of practically one half of the diameter

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of the spirals would be about the right spacing of the hoops for a beam. However, I do not think that the Vandenburgh patent for beams would have great practical value for just the very objection I raised against the Hyatt patent, that is the kerf that has to be cut in the tensile member, because for beam purposes and as a longitudinal member in beams, the longitudinal member is the principal member resisting the strain of tension on that side of the beam.

Q. And the other members running up diagonally into the concrete, whether they be a single rod or loops or double loops or single loops or whatever device it is, is only, we will say, for three purposes: First, to transmit from the concrete into the longitudinal members the stresses in the body of the concrete. Second, to prevent that diagonal shear at right angles or substantially at right angles to the line of this subsidiary reinforcement which takes place or tends to take place in a concrete beam when strained under load. And third, by considering or treating the diagonal members oppositely extending from the center toward the ends of the beams as part of the members of a truss, the web members, and the longitudinal reinforcement as the lower chord and the compressive strength resistance of the concrete above as the upper chord, to produce a truss action and resist the load in that way.

A. In the main I agree with your statement. There are two points I might differ on. In the first place, these pieces extending out from the beam should be at an angle of forty-five degrees. You

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did not mention any angle. That shear acts at an angle of forty-five degrees. In the second place, I would think the second and third purposes you have mentioned were practically the same thing. Otherwise, I agree with you entirely.

Q. The second and third amount to the same thing?

A. Amount to the same thing.

Q. Just a different way of describing it?

A. Just a different way of describing it. Practically I agree with you entirely.

Q. Now, all of those purposes in a beam require, that the subsidiary incidental members run at an angle of about forty-five degrees?

A. Yes sir.

Q. And oppositely from the center?

A. Yes; they get their greatest efficiency if they run forty-five degrees. They are sometimes run vertically.

Q. That is what the original and still continued use known as stirrups was?

A. Yes sir.

Q. Where they wire the small transverse member to the rod at the side of the beam?

A. Yes sir. Stirrups are still used a great deal, vertical stirrups.

Q. They are easier to apply but do not have the same efficiency?

A. Not as efficient. Commercially, they can be put in for a lower price per pound.

Q. Now, in this connection, Professor, I call your

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attention to the Defendant's Exhibit 7, a piece of rectangular iron with kerfs cut in it, and which we are told in the testimony was used as the longitudinal in a beam construction at Washington. The amount of metal in a member of the kind shown in Exhibit 7 would be determined by the depth and transverse section of the beam in which it was used, thereby determining the amount of compressive strength of the concrete you have got above it, and both applied to the load that you wanted the beam to carry, each its own weight and whatever weight would be superimposed upon it in use. Those would be the determining factors in fixing the amount of metal, assuming a given tensile strength in area.

A. Not exactly.

Q. What else?

A. The amount of area that should be in a beam is a certain percentage of the area of the beam, depending upon the allowable fibre stresses that you have. Now, your statement is wrong in one respect. You might figure out the amount of steel you would require in a beam but your concrete might be over-stressed, that is, a well proportioned beam has got a certain amount of steel for every square inch of concrete and then it will carry a certain amount of load, and if that load is exceeded both the steel and the concrete are over-stressed.

Q. Perhaps I was assuming that we all knew a little more about concrete and concrete construction or reinforcement than is disclosed in the record. I will start at the fundamentals. The perfect con-

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struction of a reinforced concrete beam would be one in which the metal at the bottom would resist a stress in extension exactly equal to the stress in compression that was afforded by the concrete of the particular mix used in the beam.

A. Yes sir, that is correct.

Q. To have more steel to resist tension than you could develop in the concrete in compression would be a waste of steel?

A. Yes sir.

Q. And more concrete than is required to offset the steel would be a waste?

A. Yes sir.

Q. And the engineers endeavor to balance those two factors as closely as they can with the materials conveniently available?

A. Yes sir.

Q. Now, in explaining to me about the amount of concrete in the beam opposed to the steel, I believe you said it is not merely a question of the amount of concrete in the beam but is a question of the amount of concrete referred to the depth of the steel from the top of the concrete?

A. No. I think you are wrong about that. I take it there is a certain percentage—

Q. I will put it another way. If you had thirty-six square inches of concrete in sectional area above the center of gravity of your steel, that is, the center of the steel rod, and that thirty-six inches consisted of a beam that was nine inches wide and four inches deep, it would not have the same compressive

(Testimony of Horace R. Thayer.)

strength as if it was a beam that was only six inches wide and six inches deep about the center of gravity. —That is a beam, in which the concrete, of the same actual amount of concrete, was greater in depth and narrower in width, would have more compressive resistance than if the beam was one where the same concrete was shallow in depth and broad in width.

A. Exactly, but the same area requires the same percentage of steel, nevertheless that is to say, if you had thirty six square inches, it would have to be reinforced by the same amount of steel, to get the full efficiency, whether it was a six by six or four by nine. That is we take the depth as the distance from the top of the beam down to the center of gravity of the steel in all cases. That is, the six inches in depth would be measured from the top of the beam down to the center of the steel. —Take what is known as a balanced ratio under the Pittsburgh Building Code, with which I am familiar and under which I have done a good deal of designing. That balanced ratio is seventy-five one-hundredths of one percent. That would mean for thirty six square inches of concrete we would put in .27 of a square inch of steel and that would develop the steel and the concrete, and when you have sixteen thousand pounds every square inch in your steel, you have six hundred and fifty pounds very square inch in your concrete, no matter in what form you put your beam. If you set an ordinary oak plank two inches thick and eighteen inches wide, and say sixteen feet long on edge it will support a great deal bigger load than it would if it

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lay flat on its side. In a reinforced concrete beam the steel on one side and the concrete on the other do what the wood in a wooden plank does on both sides. The load would be very much decreased with this eighteen by two inch beam, you speak of, but the two would fail together. That is, the steel and the concrete would fail together, provided they put the economic ratio in.

Q. This Exhibit 7 shows a longitudinal rod, and the testimony shows that it was used in beam construction, and that the diagonal kerfs shown in it were oppositely opposed from the center of the beam from which this piece was cut as a section. Now using diagonals spaced as these were and assuming that the direction of the diagonal running up into the concrete as indicated by the kerfs was about forty-five degrees each way from the center would the size of these kerfs admit of steel of sufficient size for the diagonals?

A. Yes, I would say, off-hand for the size that the steel is it would be about right. If two loops were used they might put one on top of the other. If placed side by side, I would think that the stirrups of the loops, as you call them, would be getting a little small. Those small wires would suffice because the bar exhibited here is the thing, it is the real thing, to be considered in a beam. In a column it would not make any difference how big this bar was as long as it was big enough to hold the spiral in place while the concrete was being poured and tamped? The bar covers some stress, although in practice we

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use for spacing bars light bars and generally omit them in figuring. It is felt that the spacing bars are so light that they are not worth figuring, as you spoke about some time ago. You use them as light as you can in order to save metal in the spacing bars, because they are not figured and we want to save as much as we can. We make them as small as we can and to support the spirals in position.

Q. Now, coming to Vandenburgh's Fig. 6, the device which he indicates as the one adapted to columnar construction, would you say as a practical man that with double loops on spacing bars oppositely opposed and intermeshed in that way, set up inside of a form for the purpose of pouring concrete in, and with somebody ten feet up above, as you have illustrated in reference to Hyatt, pouring the concrete in and tamping it in so as to get it solidly tamped around and in contact with the reinforcement at all points, would be practicable to use?

(Pages omitted in narrative reduction.)

(Testimony of Horace R. Thayer.)

of attachment to the Hyatt design in Fig. 4, you have considerably emphasized the proposition that the application of Norwood to that was impracticable because the tie rod of Hyatt as compared with the spiral of Hyatt would not permit a sufficiently deep kerf in the tie bar?

A. Yes.

Q. Now, examining the Vandenburgh patent in suit by the same rule of comparison of relative dimensions, would you say that a design such as Vandenburgh's Fig. 1, showing a spacing between the spirals of practically one half of the diameter of the spirals would be a practicable construction for columnar purposes?

MR. GRIFFIN: The question is objected to, as Fig. 1 is not an issue in this case, and upon the further ground that it is well understood that patent office drawings are not made to scale.

MR. GUTHRIE: I thought that was true when I was asking about Hyatt. Answer the question.

A. Fig. 1 is a beam, and I would say roughly that he had shown about the right spacing of the hoops for a beam. However, I do not think that the Vandenburgh patent for beams would have great practical value, for just the very objection I raised against the Hyatt patent.

Q. What is that?

A. That is the kerf that has to be cut in the tensile members.

Q. That is because for beam purposes and as a longitudinal member in beams, the longitudinal

(Testimony of Horace R. Thayer.)

member is the principal member resisting the strain of tension on that side of the beam.

A. Exactly, yes sir.

Q. And the other members running up diagonally into the concrete, whether they be a single rod or loops or double loops or single loops or whatever device it is, is only, we will say, for three purposes: First, to transmit from the concrete into the longitudinal members the stresses in the body of the concrete. Second, to prevent that diagonal shear at right angles or substantially at right angles to the line of this subsidiary reinforcement which takes place or tends to take place in a concrete beam when strained under load. And third, by considering or treating the diagonal members oppositely extending from the center toward the ends of the beams as part of the members of a truss, the web members, and the longitudinal reinforcement as the lower chord and the compressive strength resistance of the concrete above as the upper chord, to produce a truss action and resist the load in that way.

A. In the main I agree with your statement. There are two points I might differ on. In the first place, these pieces extending out from the beam should be at an angle of forty-five degrees. You did not mention any angle. That shear acts at an angle of forty-five degrees. In the second place, I would think the second and third purposes you have mentioned were practically the same thing. Otherwise, I agree with you entirely.

(Testimony of Horace R. Thayer.)

Q. The second and third amount to the same thing?

A. Amount to the same thing.

Q. Just a different way of describing it?

A. Just a different way of describing it. Practically I agree with you entirely.

Q. Now, all of those purposes in a beam require that the subsidiary incidental members run at an angle of about forty-five degrees?

A. Yes sir.

Q. And oppositely from the center?

A. Yes; they get their greatest efficiency if they run forty-five degrees. They are sometimes run vertically.

Q. That is what the original and still continued use known as stirrups was?

A. Yes sir.

Q. Where they wire the small transverse member to the rod at the side of the beam?

A. Yes sir. Stirrups are still used a great deal, vertical stirrups.

Q. They are easier to apply but do not have the same efficiency?

A. Not as efficient. Commercially, they can be put in for a lower price per pound.

Q. Now, in this connection, Professor, I call your attention to the Defendant's Exhibit 7, a piece of rectangular iron with kerfs cut in it, and which we are told in the testimony was used as the longitudinal in a beam construction at Washington. The amount of metal in a member of the kind shown in

(Testimony of Horace R. Thayer.)

Exhibit 7 would be determined by the depth and transverse section of the beam in which it was used, thereby determining the amount of compressive strength of the concrete you have got above it, and both applied to the load that you wanted the beam to carry, each its own weight and whatever weight would be superimposed upon it in use. Those would be the determining factors in fixing the amount of metal, assuming a given tensile strength in area.

A. Not exactly.

Q. What else?

A. The amount of area that should be in a beam is a certain percentage of the area of the beam, depending upon the allowable fibre stresses that you have. Now, your statement is wrong in one respect. You might figure out the amount of steel you would require in a beam but your concrete might be over-stressed, that is, a well-proportioned beam has got a certain amount of steel for every square inch of concrete and then it will carry a certain amount of load, and if that load is exceeded both the steel and the concrete are over-stressed.

Q. Perhaps I was assuming that we all knew a little more about concrete and concrete construction or reinforcement than is disclosed in the record. I will start at the fundamentals. The perfect construction of a reinforced concrete beam would be one in which the metal at the bottom would resist a stress in extension exactly equal to the stress in compression that was afforded by the concrete of the particular mix used in the beam.

(Testimony of Horace R. Thayer.)

A. Yes sir, that is correct.

Q. To have more steel to resist tension than you could develop in the concrete in compression would be a waste of steel?

A. Yes sir.

Q. And more concrete than is required to offset the steel would be a waste?

A. Yes sir.

Q. And the engineers endeavor to balance those two factors as closely as they can with the materials conveniently available?

A. Yes sir.

Q. Now, in explaining to me about the amount of concrete in the beam opposed to the steel, I believe you said it is not merely a question of the amount of concrete in the beam but is a question of the amount of concrete referred to the depth of the steel from the top of the concrete?

A. No. I think you are wrong about that. I take it there is a certain percentage—

Q. I will put it in another way. If you had thirty-six square inches of concrete in sectional area above the center of gravity of your steel, that is, the center of the steel rod, and that thirty-six inches consisted of a beam that was nine inches wide and four inches deep, it would not have the same compressive strength as if it was a beam that was only six inches wide and six inches deep above the center of gravity.

MR. GRIFFIN: This line of cross examination is objected to upon the ground that particular de-

(Testimony of Horace R. Thayer.)

signs of beams or columns are not in issue in this case.

MR. GUTHRIE: I am only asking the questions so that the professor and I may get into accord as to the preliminaries before I come down to the real questions.

THE WITNESS: Let me have those dimensions.

Q. That is, a beam in which the concrete, of the same actual amount of concrete, was greater in depth and narrower in width, would have more compressive resistance than if the beam was one where the same concrete was shallow in depth and broad in width.

A. Exactly, but the same area requires the same percentage of steel, nevertheless; that is to say, if you had thirty six square inches, it would have to be reinforced by the same amount of steel, to get the full efficiency, whether it was a six by six or four by nine. That is, we take the depth as the distance from the top of the beam down to the center of gravity of the steel in all cases. That is, the six inches in depth would be measured from the top of the beam down to the center of the steel.

Q. Let us get facts to start with about which there is no disagreement. Assuming a beam twenty feet long to support its own dead weight and a live load of one hundred pounds per square foot, how much steel would you require before we come to the question of concrete?

A. I would have to take and figure that out. Furthermore, you have not given me the spacing of your

(Testimony of Horace R. Thayer.)

beams. I would have to have that, and it would take me an hour or so without a set table.

Q. We will assume thirty six square inches of concrete in section above the center of gravity of the steel.

A. Yes sir.

Q. And we will assume that the depth of that concrete above the center of gravity of the steel is only two inches, and that the width of the concrete to develop thirty six square inches was eighteen inches.

A. Yes sir.

Q. Now, that concrete would crush under a load before it developed the tensile strength of a steel rod of a much smaller size than if the beam was nine inches deep and four inchs wide. Now, I know that it takes the same steel in area to develop the same strength as against a certain amount of compressive strength, but if the same amount of concrete is only two inches deep above the steel, the concrete itself would give way before it developed the steel to a point which a depth of nine inches and four inches in width would develop?

A. I cannot agree with you there.

Q. You do not seem to agree with any authority on the subject.

A. I would like to hear of any authority that disagreed with me.

Q. I haven't a bunch of books here, but I might get you a few. Look it up when you get home.

A. I do not care about looking it up. Take what

(Testimony of Horace R. Thayer.)

is known as a balanced ratio under the Pittsburgh Building Code, with which I am familiar and under which I have done a good deal of designing. That balanced ratio is seventy-five one-hundredths of one percent. That would mean for thirty six square inches of concrete we would put in .27 of a square inch of steel and that would develop the steel and the concrete, and when you have sixteen thousand pounds every square inch in your steel, you have six hundred and fifty pounds every square inch in your concrete, no matter in what form you put your beam.

Q. Let me be fair, professor. Take a simple illustration. Take an ordinary oak plank two inches thick and eighteen inches wide, and say sixteen feet long. Now, if that is used as a beam the bottom of the wood furnishes the tensional resistance, and the upper part of the board furnishes the compressive resistance, does it not?

A. Yes sir.

Q. Now, if you would set that beam on its two inch edge it would support a great deal bigger load than it would if you would lay it flat on its side, would it not?

A. Yes sir.

MR. GRIFFIN: I object to the question on the ground it is immaterial to any issue in this case.

Q. Now, in a reinforced concrete beam the steel on one side and the concrete on the other do what the wood in a wooden plank does on both sides?

A. Yes. The load would be very much decreased

(Testimony of Horace R. Thayer.)

with this eighteen by two inch beam you speak of, but the two would fail together. That is, the steel and the concrete would fail together, provided they put the economic ratio in.

Q. All right. I think that will bring us back to this Exhibit 7. This Exhibit 7 shows a longitudinal rod, and the testimony shows that it was used in beam construction, and that the little diagonal kerfs shown in it were oppositely opposed from the center of the beam from which this piece was cut as a section. Now, using diagonals spaced as these were and assuming that the direction of the diagonal running up into the concrete as indicated by the kerfs was about forty five degrees each way from the center?

A. Yes.

Q. And that a loop diagonal after the method of the Vandenburgh Fig. I or Fig. 4, of either a single coil or a double coil, was used, would it be your judgment as an engineer that the size of this kerf would admit of the inclusion of this small incidental diagonal of a sufficient size to serve the purpose?

A. I would say offhand for the size that the steel is it would be about right.

Q. If two loops were used, they would have to be about half the size or less than one half the size of a single loop so as to get into this kerf?

A. They might put one on top of the other possibly. If two loops were used and placed side by side, I would think that the stirrups of the loops, as you call them, would be getting a little small.

Q. Those small wires would suffice because this

(Testimony of Horace R. Thayer.)

bar exhibited here is the thing, it is the real thing, the primary fundamental thing to be considered.

A. That is in a beam, yes.

Q. Whereas in a column it would not make any difference how big this bar was as long as it was big enough to hold the spiral in place while the concrete was being poured and tamped?

A. Yes, the bar covers some stress, although in practice we use for spacing bars light bars and generally omit them in figuring.

Q. That is, to save as much metal as you can where it is not needed?

A. You take it, it is felt that the spacing bars are so light that they are not worth figuring, as you spoke about some time ago.

Q. That is, you use them as light as you can in order to save metal in the spacing bars?

A. Yes, because they are not figured and we want to save as much as we can. We make them as small as we can and to support the spirals in position.

Q. Now, coming to Vandenburgh's Fig. 6, the device which he indicates as the one adapted to columnar construction, would you say as a practical man that with double loops on spacing bars oppositely opposed and intermeshed in that way, set up inside of a form for the purpose of pouring concrete in, and with somebody ten feet up above, as you have illustrated in reference to Hyatt, pouring the concrete in and tamping it in so as to get it solidly tamped around and in contact with the reinforcement at all points, would be practicable to use?

(Testimony of Horace R. Thayer.)

A. I would say it would work, but, as you say, it would not be practicable because we have got better methods of doing it.

Q. Would you agree with Considere in his statement incorporated in the record and which you heard read, that it is essential to leave in the core of the column sufficient open space to let the concrete flow freely and be tamped in so as to come in contact all around?

A. Yes sir, I would agree with him.

Q. Now, turning to this Fig. 4 of Vandenburgh's, and assuming that it does pertain to columnar construction as a separate unit, not used as in Fig. 6, but used independently, would you say as an engineer that it would suggest to you columnar construction, considering the spacing of the spirals with reference to their diameter?

A. I don't quite understand the question.

(Question read)

A. If you consider the cut to scale, I would think that the spacing of the spirals ought to be closer, that is, from tests which we have gotten out.

Q. It would not suggest a spiral as pictured in the Figure because it would show a spacing that, while properly adjusted to beam construction, would not be properly adapted to columnar construction with that spacing.

A. That spacing is shown as about one-third the diameter. It ought to be closer, that is all. It is about the right type of columnar construction, but the spacing needs to be closer.

(Testimony of Horace R. Thayer.)

Q. Now, take your copy of this patent. I want to call your attention carefully to certain parts of the description.

A. The original, or the re-issue?

Q. They are both the same. Either will do. Now, it says, commencing at line 42 of the first page, that, "The numeral 1 designates a bar which may be of any desired construction or configuration and supported in any preferred manner". That means to you that Fig. I is for beam construction solely?

A. Well, no. No. I is shown in Fig. 4 also, also in Fig. 6.

Q. Just leave Fig. 4 out. Take Fig. 1. That would not be adapted to columnar construction, where the obliquity of the incidental spirals is oppositely oposed to the center?

A. Fig. 1 is given here to, and also given there (indicating on patent)

Q. Fig. 1 does not refer to the numeral 1. I mean the figure 6 now?

A. But in line 42 it says, "The numeral 1 designates a bar."

Q. That is the numeral 1 designating the longitudinal bar in all the figures. My question now is directed to Fig. 1 as a whole, without reference to numeral 1, designating the main bar.

A. That is, you wanted me to explain lines 42 to 45?

Q. No. Put that aside for a moment. Omit numeral 1 altogether for the present. Fig. 1 would indicate purely a beam construction, would it not?

(Testimony of Horace R. Thayer.)

A. Yes sir.

MR. GRIFFIN: The question is objected to as Fig. 1 is not in issue in this case.

A. (continuing) Although it might be used as a column, but it would not be a well designed column.

Q. And it would not be the equivalent of the continuous coil in column hooping?

A. Not as good, no.

Q. Now, turning to line 29, it says there: "In the drawings, Figure 1 is a vertical section showing the bar applied to supporting girders or beams." Now, you understand that means the bar construction as a whole; do you not?

A. Yes sir.

Q. Then it goes on to say, "Fig. 2 is an enlarged vertical section on the line 2-2, Fig. 1." That you would regard as a detail showing how Fig. 1 would look if you looked at the end of it down through the [illegible]

A. Yes, or section. It is a section through the middle. Practically the same thing.

Q. Then it goes on to say: "Fig. 3 is a detail in perspective of the primary and secondary coils shown in Fig. 1." Would you understand that detail to give you merely a clearer view of how the double coils in Fig. 1 run, one coil from one end of the bar to the other, reversing in the middle, and the other coil from the other end of the bar to the first end, reversing in the middle?

A. Yes.

(Testimony of Horace R. Thayer.)

Q. That is, it is only, like Fig. 2, a detail showing part of Fig. 1 more clearly?

A. Yes sir.

Q. Now, it goes on to say: "Fig. 4 is a similar view of a modified form using one coil." Now, when he states that Fig. 4 is similar to Fig. 1 except that it shows a modified form of Fig. 1, while there is only one coil instead of two, would you not understand that, with the explanation of Fig. 3, which you have already explained, represents a mere detail and that Fig. 4 as a similar view showed the same kind of a detail with the change only in respect to using one coil instead of two?

MR. GRIFFIN: Question is objected to, as this patent speaks for itself and requires no explanation by this witness.

A. Well, of course, I would rather assume that in a method of construction like this, that it would not prevent alteration of certain dimensions if the designer saw fit to make them.

Q. I understand that an engineer can get an idea and develop it, but what I want to ask you as an expert who has been asked to construe these patents and explain them, to tell the court what they meant, is whether or not you would say that when Fig. 3 is, as you have stated, specifically, a mere detail of part of Fig. 1, using two coils, and Fig. 4 is said to be a similar view, similar to Fig. 1, representing the same part of the bar as Fig. 1 but modified only in respect to using one coil instead of two, that the

(Testimony of Horace R. Thayer.)

description meant that Fig. 4 was to illustrate a detail of a part of the bar shown in Fig. 1.

MR. GRIFFIN: The same objection.

A. It shows the method of construction. You take it if I was asked to design a beam of the Vandenburgh patent, all these details would be figured out, the size of the rods, and the spacing of the rods, the rods would be increased as the spacing gets greater in the middle than it is at the ends, or if the spacing is made less in the ends, or if I put one coil in instead of two, the spacing would be made one half as great, and I would consider it all the way through. You take it in our design work, we not only would figure out the size of the coils, we might go as far as to figure the size of the kerfs.

Q. I am afraid you do not understand me. The point upon which I am asking your opinion is this: That when you read this patent and when the patent says, and you say that it says, that Fig. 3 is a detail intended to represent in detail, as other details do, but a part, not the whole of a bar, and when Fig. 4 is stated to be a similar view with a modification in respect to the omission of one coil, if Fig. 4 is not intended to represent a detail or part of a bar and not intended to represent a complete bar in itself.

MR. GRIFFIN: The question is objected to, as Fig. 4 speaks for itself, and the patent speaks for itself, and is its own explanation, and does not require explanation by this witness.

A. I would say that it is a detail of it, but I would think that the individual measurements

(Testimony of Horace R. Thayer.)

might be varied; that is, I would not think that necessarily the spacing between the kerfs need be the same, in this case that they are in this, in the case of Fig. 4, as they are in Fig. 3. That would be a matter for the designer and would depend upon the loads to which they would be subject.

Q. Now, I want to come to an entirely different proposition. In this Vandenburgh patent, calling your attention now to the part of the description commencing at line 16, page 1; "The invention has for an object to provide a reinforcing bar with one or more spirally-disposed coils secured to the bar so as to provide an extended area of contact adapted to resist strain longitudinally and laterally of the bar, and to form a truss within the body of concrete or other plastic material which provides the maximum of suporting strength in the arch or surface to be formed." You would not say that the object of the invention which Vandenburgh claims to have made was to provide a truss action?

MR. GRIFFIN: The question is objected to as the patent speaks for itself.

A. Of course, I cannot tell what Vandenburgh had in his mind at the time he wrote this patent, but a truss action occurs in a column just the same as it does in a beam, so that I do not think it would be vital.

Q. The truss action—

A. Yes sir.

Q. —would not occur unless the minor subsidiary diagonals were extended in opposite directions from

(Testimony of Horace R. Thayer.)

the center, would it?

A. Well, with concrete they ought to be extended in opposite directions from the center. The truss action would occur anyway, but they would not be efficient in resisting that truss action unless they extended in opposite directions to the center.

Q. Now then, turning to line 65 of the patent, where it says: "thus providing a construction in which all lateral pull or strain of the coil is avoided, owing to the equalization thereof by the oppositely-extending coils, and the tendency of the coils to move or flatten toward the face of the bar resisted." Would you interpret that to accomplish this result of equalizing the lateral pull or strain it would be necessary to have the coils oppositely extended from the center?

A. I could not agree with him on that. I do not see how you can have the pull or strain on the coils.

Q. He does not avoid it. He seeks to equalize it, he says.

A. He says: "thus providing a construction in which all lateral pull or strain of the coil is avoided."

Q. "Owing to"—

A. It says: "is avoided, owing to the equalization" I do not see how he can avoid it.

Q. There would be no tendency in that direction unless they were oppositely extended, would there?

A. I do not agree with him on his analysis of that.

Q. He says that it is desirable that both the coils,

(Testimony of Horace R. Thayer.)

that is, the two coils used, be deflected away from the center of the bar. Is that desirable to accomplish the purpose of this construction?

MR. GRIFFIN: The question is objected to as relating to matter not in issue in this case.

A. It is desirable to point them as shown in Fig. 1, away from the center of the beam, even in a column.

Q. Then all of this column hooping, where the coil runs in one continuous direction without reversal from the center, is wrong, is it?

A. No. That action is a different matter entirely. The theory of beam action and the theory of hoop columns is entirely different. If you were going to reinforce it to carry as a beam, you would reinforce it one way. If you were going to reinforce it as a hooping, you would reinforce it another.

Q. Do you agree with Vandenburgh that the tendency of a weight upon his construction would be to draw these coils upward into a position at right angles to the bar? Not that it would accomplish it, of course, in a solid mass of concrete, but that the tendency would be in that direction?

A. I would not think so. It would to a certain limited extent possibly, a very limited extent.

Q. It would not do it to any extent if the coils was a single continuous coil running in the same direction of spiral on both sides of the center?

A. No. I cannot agree with him as to his idea of the action of the beam or column under stress.

Q. I asked you if we assume that the column

(Testimony of Horace R. Thayer.)

hooping construction, where the spiral runs continuously in a single direction without changing its center, were used, whether there would be any tendency at all to draw the coils upward at right angles?

A. The coils are practically at right angles already.

Q. I mean the column hooping construction, where the coils are oblique.

A. I do not see that they would change in their position at all to be worth mentioning. There might be a slight tendency to change them.

Q. Now, turning to line 80 of page 1, where Vandenburgh says that: "As a preferred means of securing the coils to the bar I have shown a series of kerfs 8 in one face of the bar inclined away from the center of the bar toward the opposite ends thereof." Reading this patent, do you understand that Vandenburgh intended to confine himself to the kerf as a means of affixation any more than Hyatt confined himself to the riveting as a means of affixation, or that Vandenburgh preferred the kerf as his means as Hyatt preferred the rivet as his means, but each leaving himself to adopt any means desired?

MR. GRIFFIN: Objection is made to the question upon the ground that the patent speaks for itself, and requires no explanation by this witness.

A. My understanding is that Vandenburgh laid a great deal of stress on that kerf all the way through, the integral means of securing the bar.

Q. I agree with you because of his statement that

(Testimony of Horace R. Thayer.)

the kerf is a preferred means, but I am asking you as an expert interpreter of this patent, whether you consider that Vandenburgh intended to limit himself to kerfs or whether he only recommended the kerf as the preferred means of securing the coil.

MR. GRIFFIN: The same objection, and besides that the further objection that the claims determine the issue and not the specifications of the patent.

A. Well, it is the only method that he speaks of. He calls it a preferred means, and some of his claims are based entirely on the kerfs. He uses the term "integral" in places, and at the time that he got out this patent I do not know of any method that he could have had in mind that would have integrally secured it except that of the kerfs. Of course, now we have electric welding, but I think he must have had that largely in mind as the means.

Q. The question is, do you, as an expert, think he intended to limit himself to kerfs as against any other method that he might himself or somebody else might themselves later prefer to use?

MR. GRIFFIN: The same objection.

A. I should judge from my reading it over that he had kerfs in mind, but that he wanted to leave it open if he could get any other way. He probably had the kerfs in mind, because he has shown them all the way through his cuts.

Q. That puts us in perfect accord, professor, and we will proceed. Now, you turned to the claims a moment ago. Do you understand it to be the rule

(Testimony of Horace R. Thayer.)

of the construction of claims in a patent that the description is intended not only to support the claims but that the description may be referred to, taking the patent as a whole, for the purpose of understanding the sense in which any particular language not otherwise entirely clear in the claims was intended to be used in the claims?

MR. GRIFFIN: I object to the question upon the ground that that is a proper subject matter for the court to consider and that it is entirely irrelevant and immaterial.

A. I am not an expert on that matter. I only understand about drafting and things like that. I would think that the drawings and descriptive matter would have about equal weight.

Q. Now, then, turning to claim 3, for instance, where he uses the term "kerfs", without describing kerfs any more than the mere use of the term, then turning back to line 82 of page 1 of the patent, where he speaks of his kerfs as a "series of kerfs in one face of the bar inclined away from the center of the bar toward the opposite ends thereof," what would you say as to whether, as you understand it, in reading claim 3, he meant by the use of the term "kerf", the kind of kerf which is described in his description?

MR. GRIFFIN: I object to the question, as the patent speaks for itself and requires no explanation from this witness, and further, it is a matter of interpretation for the court.

A. Well, I would think this, that in lines 80 to

(Testimony of Horace R. Thayer.)

85 he says he has shown a "series of kerfs inclined away from the center of the bar toward the opposite ends thereof." He is speaking then of what he has shown. In claim 3 he is claiming all kerfs. I would think that he claimed all kerfs but he showed in this particular one the style of kerf that was most suitable for the beam, in which I would agree with him, that is, that it is the most suitable kerf for the beam.

(Noon adjournment)

Q. I understood you to testify, in answer to a question by Mr. Griffin that the method of attachment of the spiral to the spacing bar shown in Defendant's Exhibit No. 1 was the same in general type of action as that shown in the Vandenburgh patent in suit?

A. Yes, sir.

Q. You mean by that they are substantially the same?

A. That is, they fasten integrally by means of a kerf to the spirals.

Q. That Exhibit 1 shows, first, a rectangular cut?

A. Yes.

Q. In the lower part of the T member?

A. Yes.

Q. While Vandenburgh shows a diagonal cut in a flat member?

A. Yes, sir.

Q. They differ in that respect?

A. They differ in that respect, yes, sir.

Q. Exhibit 1 shows a kerf originally with no pro-

(Testimony of Horace R. Thayer.)

jecting prong over the encircling rod as orginally inserted, while the Vandenburgh patent would show a projection over the rod before it was originally inserted and before it was pounded down?

A. Yes, sir.

Q. Exhibit No. 1 shows the encircling spiral held in place in the rectangular cut by creating an overlapped member by peening or cutting down into the bar so as to shift or move a portion of the metal of the bar over the spiral?

A. Yes, sir.

Q. While the Vandenburgh patent shows that the embracement is completed simply by bending the already overlapping spur down so as to close the opening?

A. Yes sir.

Q. Now, you regard those as substantially the same thing in engineering?

A. Yes; I would call it a kerf, a kerf joint.

Q. As far as holding a transverse member seated in a rectangular kerf, if you so designate it, in a longitudinal member, peening down the adjacent metal so as to create a projection in the process of peening, that was well known in the metal working art before Vandenburgh, was it not?

A. Yes.

Q. I call your attention to the patent to Kieserling, No. 73,004, German, appearing at page 261 of the Pittsburgh record, and to Fig. 5 of the drawing. Does Fig. 5 disclose to you an encircling embracing spiral continuous in one direction seated in kerfs?

(Testimony of Horace R. Thayer.)

A. Yes sir.

Q. The only difference between that kerf and Vandenburgh's kerf is that the projection does not affirmatively and clearly appear to have been battened down or pressed down over the coils? That, and the fact it was not collapsible because of the number of bars?

A. No, the ring on the outside, that is, the enlargement of the bottom, which would prevent the collapsing.

Q. Because as a part of Kieserling he showed an enlargement such as the top of Fig. 8?

A. He does not show any pounding down but I imagine that was pounded down.

Q. That would be the natural thing to do, that would be the assumption. So that the distinction you make in that respect is that it was not collapsible, because spread out at the top as shown in Fig. 8?

A. Yes, and of course this is substantially a different type of construction. It is a pipe construction, the laws of which are different from that of columns.

Q. But as in Hyatt, the British patent heretofore referred to, at page 189 of the Pittsburgh record, you could either have the hollow pipe as shown in Fig. 2 of Hyatt or you could have the solid member as shown in Fig. 5?

A. Yes.

Q. Now, coming back again to Kieserling, his Fig. 7-a, b, c, and referring to the outer right-hand fig-

(Testimony of Horace R. Thayer.)

ure or detail as Fig. 7-c, you find there the rectangular kerfs in the edge of a bar, do you not?

A. Yes sir.

Q. That was for a different method of carrying out the same thing as Fig. 5, just a difference in detail of attachment?

A. Yes sir.

Q. Does that indicate to you or suggest whether or not those edges might be peened down or not?

MR. GRIFFIN: I object to the question. The patent speaks for itself. It requires no interpretation by this witness.

A. Why, I would imagine that that could be done.

MR. GRIFFIN: I move to strike out the answer of the witness, as he indicates by the answer that he has no knowledge upon that subject.

Q. Now, turning to Prescott and Bennett, patent No. 447,162, appearing at page 299 of the Pittsburgh record, and turning to Fig. 3 thereof, that actually discloses the familiar process you have referred to and which you deem probable in the Kieserling patent of peening down the edges of the longitudinals adjacent to the rectangular kerfs for the purpose of enclosing the transverse member, does it not?

A. Yes sir.

Q. That is made plain in the patent itself, commencing at line 47 of the patent, reading as follows: "On the shaft G are secured sets of spokes K which support at their outer ends longitudinally-extending bars L, each provided with recesses L′ formed on their inner sides and adapted to receive the coils

(Testimony of Horace R. Thayer.)

of a wire N forming the meshes of the screen. The wire N is coiled in cylindrical form and is passed into the several recesses L′ of the longitudinal bars L after which the part L2 extending between two successive recesses L′ is hammered so as to cover the coil, thereby holding the latter in place on the longitudinal bars. The coil of wire N extends throughout the length of the bars L and the coils are placed suitable distances apart." That makes it perfectly clear, does it not?

A. Yes sir.

Q. Calling your attention to the patent to Bauman, No. 212,645, of 1879, that shows the transverse sections in Fig. 1 seated in rectangular kerfs in the longitudinal section.

MR. GRIFFIN: Possibly, to expedite the matter, I can make this admission, which I made yesterday in court, that we admit that prior to this invention it was old to secure sundry transverse members to other members by means of kerfs which were hammered down upon the transverse members, but not in connection with spirals or spiral concrete reinforcing.

MR. GUTHRIE: Does that include also an admission that the transverse members so seated in the kerfs of the longitudinals were held in place by peening down the intervening section of the longitudinal so as to there by the process of peening create a spur or projection from each side over and enclosing the transverse member?

MR. GRIFFIN: Yes, that will include the pro-

(Testimony of Horace R. Thayer.)

duction of a spur or prong on both sides of a slot cut into the bar at right angles thereto.

MR. GUTHRIE: Will you also admit, Mr. Griffin, that that method was common and well known?

MR. GRIFFIN: Prior to the grant of the patent?

MR. GUTHRIE: Yes.,

MR. GRIFFIN: Why, certainly. It is shown in these patents. There is no need of examining the witness upon those patents.

Q. Now, I will call your attention to the patent to Kahn, No. 736,602, appearing at page 304 of the Pittsburgh record. Kahn's figures as a whole show, do they not, the principle of a reinforcing bar or beam construction, consisting of a principal longitudinal member with attached diagonals extending in opposite directions from the center of the bar?

A. Yes sir, in the main. Most of the figures show that.

Q. Showing also a number of available methods of attaching the diagonals?

A. Yes sir.

MR. GRIFFIN: I object to the questions upon this patent, as the patent shows upon its face that it in no way discloses any spirals or means for attaching spirals to any longitudinals, and it is irrelevant and immaterial.

Q. Showing also a variety of means of creating the subsidiary diagonals to function in connection with and assist the main longitudinal, such as the

(Testimony of Horace R. Thayer.)

diagonals punched out of the center of the longitudinal?

A. Yes sir.

Q. Or punched out of the side of the longitudinal, or riveted to the longitudinal, or extending with a hub or bolt at the lower side through holes in the longitudinal.

A. Yes sir.

Q. In the description of the Kahn patent, do you find a disclosure to you, as an engineer, that these subsidiary diagonals would assist in creating and effectuating the function of the tension bar by right angling substantially the oblique crack tendency of concrete, getting a grip up in the concrete transferred to the main bar and developing the truss action?

A. Yes sir, substantially as has been already mentioned.

Q. Now, in these aspects of beam construction the Vandenburgh patent departed from the Kahn patent in only two items of detail, that is, the better encircling by the subsidiary members through the use of a hoop, and the commercial advantage of seating the loop diagonals in these kerfs.

MR. GRIFFIN: I object to the question as irrelevant and immaterial. The patents show for themselves wherein the differences are.

A. The Kahn method would be better for beams, the Vandenburgh method better for columns. I think, unless I am mistaken, that Kahn tried to use this scheme for columns—

(Testimony of Horace R. Thayer.)

Q. If you will kindly give attention to my questions and answer them directly, we will progress to matters which you sometimes seek to anticipate.

The question was whether there was any departure in Vandenburgh over Kahn except the substitution of encircling subsidiary members, which obtain a better hold upon the concrete, and the commercial advantage of fixing a continuous coil in kerfs to create the diagonal members? I am speaking now exclusively from the standpoint of beam construction.

A. I will have to answer about the same as I did before, namely, that the Vandenburgh method was better, proved to be better, in column construction, but not as good in beam.

Q. I did not ask you which is better. What I asked you was not which was better, but whether Vandenburgh departed from Kahn in any way except in the two respects I have mentioned, as far as beam construction was concerned.

A. You spoke about that as being advantageous. I agree with you—

Q. I did not ask you anything about advantages. I asked whether Vandenburgh departed from Kahn from the standpoint of beam construction except in substituting the detail of an encircling loop for Kahn's straight subsidiary diagonal, and attaching loops through kerfs instead of attaching the straight bar as Kahn did? Was there any other departure or change on the part of Vandenburgh as far as beams were concerned?

(Testimony of Horace R. Thayer.)

A. I think, in general, that statement well represents the difference.

Q. Now, I call your attention to lines 12 and following on page 2 of the Kahn description, as follows: "In Figs. 6, 7, 8 and 9 is shown a construction which may be used as a column in which the metallic strengthening members are arranged adjacent to each of the sides of the body." Do these figures, particularly Fig. 7, show a design for columnar construction by the adaptation of Kahn's bar with diagonals all extending in one direction by the placing in the column of two opposing bars with diagonals in such manner that the bars crossed each other towards the center of the column?

A. Yes sir.

Q. Now, except for the substitution of a loop for a bar and the affixation through the kerfs, as shown in Vandenburgh, is not this the same functional idea in columns as is shown or attempted to be shown in what you term the impracticable suggestion of Vandenburgh in his Fig. 6?

A. Yes sir.

Q. Following Kahn, I call your attention to the Pohlman patent No. 766,899, found on page 311 of the Pittsburgh record. That discloses the idea of a reinforcing bar with subsidiary diagonals in which the diagonals are constituted of independent loops at an angle of about forty five degrees, and oppositely extending from the center of the column, does it not?

A. Yes sir.

Q. That differs from Vandenburgh, however, in

(Testimony of Horace R. Thayer.)

that the loops are each independent instead of part of a continuous coil?

A. Yes sir.

Q. And in being secured through holes in the main bar?

A. Yes sir.

Q. And Peabody patent, No. 805,663, page 317, discloses the same idea?

A. Yes sir.

Q. Except that the loops are double and attached to the main bar in a different way?

MR. GRIFFIN: Objection is made to the questioning upon the Peabody patent, for it shows upon its face that it contains nothing relating to spirals or means for securing spirals to a longitudinal fastening.

Q. Is the same true of the Golding patent, No. 815,157, at page 320 of the Pittsburgh record?

A. Yes sir.

Q. And of the modification in use of the Golding idea shown in Fig. 2 of the cuts on page 392 of the Pittsburgh record?

MR. GRIFFIN: Objection is made to any questioning or use of the exhibit on page 392 of the Pittsburgh record upon the ground that the exhibit is in a publication dated March 15, 1906, which is less than two years prior to the filing date of the original patent.

A. Yes, practically the same idea.

Q. The advancement of Golding as shown in this construction, said to be used by The Monolith Steel

(Testimony of Horace R. Thayer.)

Company, is that he uses a method of attachment which does not change the sectional area of the bar at any place?

A. Yes; as I recollect it, he jams down the sides of the reinforcing bar.

Q. On the continuous slots?

A. Yes sir.

Q. Vandenburgh, Kahn, Pohlmann and Peabody all had this objection to their bars, that their method of reinforcement change the sectional area of the longitudinal bar so that it made it weaker in places than in others.

MR. GRIFFIN: Objection is made to questioning upon any of these patents for the reason that none of them show any spiral reinforcing, and that it is incompetent and immaterial.

A. No, I could not answer that question affirmatively. I know Kahn worked out his process. I put in Kahn bars and I followed that through. Kahn works out his system of reinforcement so that as far as possible the sectional area is maintained at the point of maximum moment.

Q. That is, he does not reduce it at the center where the strain is the heaviest?

A. He does not reduce it at the center where the strain is heaviest, so that I could not agree with you on that. That is, a good many of his bars he arranges it so that it can be done. In some bars he does not. I could not agree with you entirely on this question.

Q. Kahn and his company have been the biggest

(Testimony of Horace R. Thayer.)

people in this business since they started, haven't they?

A. Well, they have been pretty big people.

Q. Without agreeing as to whether it was a real advancement, Golding's idea was that he was advancing it by having a continuous section of the same area?

A. Yes sir.

Q. Do you find in the Vandenburgh patent any reference to or suggestion of the use of his device in column construction other than in paragraph commencing at line 89 of page 1?

A. Yes. Line 20, he says—beginning with line 16,—"The invention has for an object to provide a reinforcing bar with one or more spirally-disposed coils secured to the bar so as to provide an extended area of contact adapted to resist strain longitudinally and laterally of the bar," etc.

Q. Do you think that suggests a column?

A. I would think so.

Q. Do you not think it suggests this strain of fracture laterally of the beam across the line of obliquity of the subsidiary member?

A. No. He says, "to resist strain longitudinally and laterally." I would infer "longitudinally" meant for columns and "laterally" for beams.

Q. Other than that construction, do you find any other reference to columns except as I have indicated, commencing line 89, page 1?

A. Yes, line 39 speaks of column construction.

Q. I am talking about any suggestion not of col-

(Testimony of Horace R. Thayer.)

umns but of how his device might be used in constructing a column. Do you find anything else in the patent than what commences at line 89 of page 1 suggesting the manner in which his device might be used in a column?

A. Well, he devotes about one-third of the specific matter of his description to columns.

Q. Where? Quote it?

A. I would call lines 1 to 29 general, lines 30 to 88 beams, and lines 89 to over on to the second page columns or beams in general.

Q. Now, omitting the general, and sticking to the specific as to claims, does Vandenburgh anywhere describe a method for the use of his reinforcing bar in columns except in the paragraph commencing with line 89, page 1?

A. I think that second paragraph, that is, the one beginning with line 97, was a continuation of the work begun in the preceding paragraph, referring to that Fig. 6.

Q. Beginning again now, if we must diverge, and I must use some loops with you as well as Vandenburgh, does with this construction, I will ask you if the paragraph commencing with line 97 that you have just referred to, does not call for coils extending in opposite directions and forming a truss?

A. That might be.

Q. That would not be column construction of a continuous spiral, would it?

A. Oh yes. I do not see that prevents the assumption I made in regard to it. In fact, if you will read

(Testimony of Horace R. Thayer.)

the first paragraph of page 2, I think it will be quite apparent that the intermediate paragraph is taken up largely with column work. He says in the latter part of that paragraph: "This bar, although described in connection with arcs and column construction, is adapted for use in any character of metal, reinforced concrete or cement construction." It is evident all the time he has been talking of column work.

Q. You think his first and primary idea is of columns, do you?

A. No. I said I think about one-third of his idea was columns, and two-thirds beams.

Q. You want the court who tries this case and hears your testimony to believe that you, as an expert, believes that a spiral coiled helicoidally, continuously, from one end of the spacing bar to the other, is the same thing as coils extending in opposite directions, do you?

A. I take it that these coils extending in opposite directions refer to Fig. 6 there.

Q. Going back again to line 89 and the following lines, and just assuming, without any of your theories about it, but assuming it as a fact for the purpose only of your answer to this question, that that is the only method which Vandenburgh discloses for the use of his bars in a column, would that particular method of use be the same theory of use as disclosed by Kahn in his Fig. 7, page 304?

A. Yes sir.

(Testimony of Horace R. Thayer.)

The two men had exactly the same idea, I would say.

Q. Well, as an engineering term, intended to clearly describe to another who did not know what idea you had in mind, and must get his idea of what you did have in mind from the language or term used, would you say that a coil with its convolutions seated in recesses in a spacing bar of such light construction that the spacing member would not be taken into consideration in calculating the strength resulting in the finished structure was properly called a bar?

A. The term "bar" is not ordinarily used in referring to what they call spirals, still they use them at the present time up to one half inch in diameter and they call that a bar.

Q. Where the longitudinal is of a size and design to furnish in itself, whether aided or unaided, the primary substantial reinforcing strength, you call it a bar?

A. I would think so.

That line is not clearly established.

Q. To put it in another way, where the straight bar was the main thing, you would call it a reinforcing bar even though it might have some incidental attachments?

A. We would call it a reinforcing bar where you figure it in the stresses. Where it is not figured, we call it a spacing bar, provided it is used to hold the spirals in position.

Q. And where a coil was the main thing and was

(Testimony of Horace R. Thayer.)

the part upon which you depended functionally, you would call it a coil, would you not?

A. Yes. "Hooping" is the term I have ordinarily used.

Q. Hooping is a term that has been well known since Considere?

A. Yes.

Q. Now, in answer to a question by Mr. Griffin, I understood you to state that these patents subsequent to Vandenburgh, McClure, No. 992,970, Burk, No. 1,016,319, Bindley and Mogan, No. 1,115,490, Turner, No. 1,159,297, and Hough, No. 1,172,026, disclosed constructions substantially the same as Vandenburgh?

A. Well, they had Vandenburgh's idea of connecting them up, spirals, by means of integral connections to spacing bars.

Q. Assuming that column hooping was within the disclosure of the Vandenburgh patent, this McClure patent showed everything in Vandenburgh and in Defendant's construction, Defendant's Exhibit No. 1, including a coil and two spacing bars and the identical form of kerf pressed down and tongue of Vandenburgh, so that if it was not pressed down too tight, it would be collapsible, did it not?

A. That would ordinarily be collapsible.

Q. And to the rest of my question you would answer in the affirmative, would you?

A. Would you repeat it?

(Question read)

A. Yes. It shows the Vandenburgh method of

(Testimony of Horace R. Thayer.)

connecting to the spacing bar but the spiral is continuous between the two bars rather than made in two separate spirals.

Q. What do you mean by made in two separate spirals?

A. Two separate spirals as shown in this Fig. 6, whereas in this one is shown as one spiral around the two spacing bars. The McClure patent differs from the Vandenburgh patent in Fig. 6 in the fact that there is only one spiral in the McClure patent. It differs from Fig. 4 in the Vandenburgh patent in the fact that there are two spacing bars in the McClure patent while there is only one in the Vandenburgh.

Q. But what do you say as to the statement that you have already made as to these three details in the Vandenburgh drawings, Figs. 3, 4 and 6, that they are only details showing the arrangement of part of his bar and do not cover a showing of his bar as a whole?

MR. GRIFFIN: Objection is made to the question for the reason that no figure other than Fig. 4 of the Vandenburgh patent is in issue herein.

A. The statement he made at that time was that this shows the method, that the exact sizes, etc., should be matters of computation and design.

Q. Taking now claim 1 of the McClure patent, reading as follows: "1. A reinforcement for reinforced concrete columns, comprising an encircling reinforcement element having a plurality of spaced encircling members, and spacing bars for said encirc-

(Testimony of Horace R. Thayer.)

ling reinforcement element having notches in which the reinforcement members of the reinforcement element are rotatively secured and having over-hanging portions for loosely holding said encircling members in notches, whereby said spacing members may be shifted longitudinally of themselves to bring said encircling reinforcement into collapsed form," and assuming for the purpose of your answer to this question that there is no contest but that Vandenburgh disclosed a spiral continuous in one direction and disclosed the suggestion of two spacing bars instead of one, and disclosed a kerf in connection with an operhanging spur not rigidly bent down so as to prevent the collapse of his spiral,—assuming all of that, does not that description or those terms in the McClure claim cover identically what Vandenburgh had previously patented?

MR. GRIFFIN: I object to the question as incompetent and immaterial, and a proper subject matter for the interpretation of the court, and upon the further ground that whatever the subsequent patents may cover is immaterial to any issue in this case, the McClure patent having been filed after the Vandenburgh original patent was filed.

A. I would think it was very similar to the Vandenburgh patent, very, very similar.

Q. Now, if the McClure patent was issued in the same division of the Patent Office, recommended by the same principal examiner, W. A. Cowles, as had recommended the Vandenburgh patent, wouldn't you say that the Vandenburgh patent would have been

(Testimony of Horace R. Thayer.)

a proper reference against the allowance of that claim to McClure?

MR. GRIFFIN: I object to the question upon the ground that this is purely speculation upon the part of the witness and that it is no province of his to determine what should or should not be cited by the examiner in the prosecution of any case, hypothetical or otherwise.

A. I would think it would have, yes sir.

Q. And the same would be true of these other patents that I gave you a list of recently, which you said were similar to Vandenburgh?

A. I would think so, yes sir.

Q. Then, in order that I may clearly understand you, if you had been the examiner who passed these McClure and subsequent column hooping patents to issue, and also had been the examiner who had passed the Vandenburgh patent to issue, you would have declined to pass the subsequent patents to issue unless you was of the opinion that Vandenburgh had not intended to patent or to cover column hooping?

MR. GRIFFIN: The same objection, and the further objection that this witness has not been qualified as competent to testify as to the actions to be taken by an examiner in the prosecution or allowance of a patent case.

A. Shall I answer?

MR. GRIFFIN: Q. Yes, I am getting tired of this. I do not think we will answer that question. If you want to continue this examination for four or five days, we will go to the court about it.

(Testimony of Horace R. Thayer.)

MR. GUTHRIE: If it had not been for your objection, I would have been through by this time and will be in a few minutes. I will be through sooner the more directly the witness answers the questions.

MR. GRIFFIN: He has no right to answer this question at all. It is not a proper question to put to him. I will let him answer it.

A. I would not have passed the subsequent patents if I had thought Vandenburgh had intended to cover column hooping.

Q. I will call your attention now to a certified copy of the file wrapper and contents of this McClure patent. And ask you to note the references, the amendments and the arguments of counsel for patentee, and see whether you discover in there anything to indicate that anybody during the prosecution of the McClure patent, had any idea that the Vandenburgh patent had anything to do with column hooping?

MR. GRIFFIN: I object to the question upon the ground that the prosecution of any case subsequent to the case of the Vandenburgh original patent could not bind Vandenburgh in any way, and as incompetent, irrelevant and immaterial.

A. I do not see anything in regard to the Vandenburgh patent.

Q. I will ask you the same question with reference to the certified copy of the file wrapper and contents of the subsequent Wedmore patent, No. 918, 715, 1908, referred to on page 384 of the Pittsburgh record?

(Testimony of Horace R. Thayer.)

MR. GRIFFIN: The question and answer is objected to on the ground that the Wedmore patent was filed more than two years subsequent to the filing of the original Vandenburgh patent, and that any action taken by the Patent Office thereon cannot bind this plaintiff.

A. I do not find herein any reference to the Vandenburgh patent.

Q. I now call your attention to the certified copy of the file wrapper and contents pertaining to the original Vandenburgh patent, and the re-issued patent in suit, commencing on page 330 of the Pittsburgh record, and the Much (Munch) and Mueser patents, referred to on page 340 of the record, and to the Peabody patent referred to on the same page, and the reference of examiner Cowles, page 343 to the Kahn patent, which are found in the Pittsburgh record on page 368, 377, 317 and 304, respectively. Will you kindly examine those four patents carefully?

A. Yes sir.

Q. Do you find in the Munch patent a construction primarily of beams and girders or of column hooping?

MR. GRIFFIN: The question is objected to as it is immaterial at the present time what the citations made by the Patent Office were during the prosecution of the applicant's case.

A. It seems to me it is a beam.

Q. It says in the description: "A reinforcing for load",—

(Testimony of Horace R. Thayer.)

A. It is headed "A new idea for beams". Evidently intended for beams only.

Q. Is Mueser, page 377 of the Pittsburgh record, also confined exclusively to beams?

MR. GRIFFIN: The same objection.

A. Well, I would have to suggest there it looks to me like a mistake. The other references seem pat This one does not. I do not see the parallelism at all.

Q. The question I am asking is whether the Peabody patent pertains to anything but beams or has any reference to columns?

A. You mean the Mueser patent?

Q. The Peabody is the one I have got down here now.

MR. GRIFFIN: Mueser is the one you are talking about.

THE WITNESS: I do not see any parallelism at all.

Q. Mueser has got nothing to do with columns anyway, has it?

A. It is "material of construction." It might be either columns or—it is a deformed bar. That is what it is. I do not see the relation between a deformed bar and spirals.

Q. Perhaps the examiner thought, if I may suggest to you, that the projecting rings of this deformity might have a little effect as diagonals. Peabody, on page 317, has no reference to columns, has it?

MR. GRIFFIN: The same objection.

A. That looks like beam construction on the out-

(Testimony of Horace R. Thayer.)

side. But it is headed "Materials of construction." It is called "Materials of construction", and the entire claim is general, but I would think from the appearance of the construction it was largely intended for beams.

Q. It could be by no stretch, from an engineering standpoint, apply to the idea of circular reinforcement to prevent expansion in columns?

A. I do not see it. No.

Q. The same thing would be true of Kahn's patent?

A. It would have to be used, if used for columns, in the same way that Kahn did.

Q. I now call your attention to these references. Will you examine these two file wrappers of Vandenburgh carefully and see whether you find any suggestion that the Vandenburgh patent was supposed to apply to any such construction as helicoidal embracement of concrete in a column to prevent expansion?

MR. GRIFFIN: Objected to, as the file wrappars are in the English language and speak for themselves.

A. Why, yes. On page 333, "The invention has for an object to provide"—

Q. Pardon me, but that is from the description which we have already discussed. I mean in the proceedings of the Patent Office.

MR. GRIFFIN: I object to that question upon the ground that it is irrelevant, immaterial and incompetent, and that no action of the examiner can

(Testimony of Horace R. Thayer.)

bind the present plaintiff other than the official action taken as appears in the file wrapper. And the further objection that whether the structure was to be used for columns or not might or might not appear from the file wrapper without in any way defeating the plaintiff's rights.

A. I do not find anything specifically referring to columns of a further nature than what we have already discussed.

Q. Now, I desire to call your attention to the argument made to the Patent Office by Vandenburgh's counsel in answer to the reference to the Swiss patent to Munch, appearing on page 345 of the Pittsburgh record, and call your attention specifically to the statement on behalf of Vandenburgh as a basis for the procurement of the allowance of his claims, "that the Swiss patent does not show the wire deflected towards the opposite ends of the bar," and further, "that by applicant's structure", stars,—

MR. GRIFFIN: I object to inserting any quotation unless the entire matter is taken. And I further object to quoting into the record matters already of record.

Q. Go ahead after the stars,—"the spiral strands when imbedded in the concrete form a structure extending continuously from the center toward the opposite ends of the bar." I desire to ask you whether in your judgment as an expert and an engineer those statements amounted to an assertion that the only device under which Vandenburgh was

(Testimony of Horace R. Thayer.)

contending as to invention was a device where the subsidiary deflected wires extended from the center toward opposite ends of the main bar, and not to a construction where the wires were coiled continuously in one direction from one end of the bar to the other?

MR. GRIFFIN: Objection to the question as it is a matter purely for the interpretation of the court, and I refuse to let the witness answer. We will go to court on that, if you want to continue this examination this way,—

MR. GUTHRIE: I happen to be right at the end of this.

Q. Professor, when did you actually first design a column hooping construction for a column?

A. Now, I could not answer that question. My recollection is that I have designed them but coming up on the train I was trying to place when I had, but I cannot place it just now.

Q. Refreshing your recollection by your testimony on the previous trial, was it not in the year 1917?

A. It might have been. I don't remember that I stated the exact date in the previous trial but I might have. My recollection was that I said I had designed them and that is still my recollection, but I cannot place the exact time or the exact place it was done.

Q. It was about that time, anyway, was it not?

A. I suppose so.

(Testimony of Horace R. Thayer.)

Q. You spoke of yourself as a teacher in the Carnegie Institute.

A. Yes sir.

Q. What position do you hold?

A. I am an associate professor of structural design at the present time.

Q. How long have you held that position?

A. I think I was made associate professor a couple of years ago. Before that I was assistant professor.

Q. Who is the head of that department?

A. A man by the name of McCullough.

Q. How many subordinates are there of equal rank with yours?

A. One.

Q. Beside yourself?

A. Yes.

Q. Have you been a writer also? to any substantial extent?

A. Yes sir.

Q. What?

A. I have written two books on structural design. I have another book on skew structural design that is ready for the printer but is held up by industrial conditions. I have a book on masonry partly finished and I have written quite a number of technical articles.

Q. At the other trial you mentioned a couple of technical articles. What were they and what others were there?

A. I wrote an article on the history of masonry

(Testimony of Horace R. Thayer.)

failures I wrote an article on the subject of masonry arches, and delivered it before the Engineers' Club of Baltimore. I wrote an article on the historic failure of steel structures for the Engineers' Society. I have written a number of magazine articles.

Q. Specify them?

A. I wrote an article for the "Engineering and Contracting Magazine" on the method for obtaining the temperature stresses in a continuous arch. I wrote three articles for the "Real Estate Journal" on semi-technical subjects and I have read a paper or two before the American Association of Engineers; that was in manuscript form.

Q. On what subject?

A. General subjects in the engineering profession.

Q. These articles on masonry, what type of masonry do they cover?

A. It was intended to cover all masonry structures.

Q. Brick and stone and reinforced concrete?

A. Yes.

Q. How large a book was this that covered this wide subject?

A. You take it those articles would cover perhaps—

Q. I am asking you about the one on history of masonry failures.

A. That was a paper read before the Engineers Society. It would be equivalent to about thirty pages of one of these records perhaps.

(Testimony of Horace R. Thayer.)

Q. What was the book you have actually published as a book?

A. I have two books published, "The Elements of structural Design." That book is now in its second edition. And "The Design of simple structures," the first edition of which is nearly exhausted and we have got to replace it very shortly now or give it up.

Q. What did "Simple Structures" cover?

A. That covered steel structures, bridges, and buildings, timber and steel.

Q. What did this other book cover?

A. Which book was that?

Q. The one that is in the second edition now.

A. Those both took up steel and wooden structures.

Q. Then you have never written any articles or published any books especially upon the subject or reinforced concrete, have you?

A. Yes, I have a book partly ready on that subject, and these articles I spoke of, the article in "Engineering and Contracting," the "Failure of Masonry Structures" was partly on reinforced concrete.

RE DIRECT EXAMINATION BY MR. GRIFFIN:

Q. Is there any advantage in the final column having the individual coils securely fastened to the longitudinals?

A. Yes sir.

Q. Will you state what that advantage is?

(Testimony of Horace R. Thayer.)

A. The advantage that it provides against displacement either laterally or vertically, both of which are very serious and interfere largely with the strength of the column; that is, to allow the one coil to be so far displaced as to be up against the next coil would weaken it just as much as if that were the uniform spacing.

Q. Will you take the Pittsburgh record and examine the Mollins patent, page 271?

A. Yes.

Q. Look at the drawings. How are the spirals secured to the longitudinals in that case?

A. By clips.

Q. Would it be feasible to clip all of the spirals in a large building to the longitudinals?

A. It would be very expensive, so expensive as to be impracticable.

Q. Do you regard clip fastenings as good as the integral prong fastener?

A. No sir; they are likely to be displaced.

Q. With respect to the beginning of the reinforcing, what have you to say as to the inherent character or collapsibility of the spiral where the single bar is used at the beginning of the work?

A. Please repeat that.

(Question read)

A. The single bar as ordinarily used with the spiral is collapsible unless the fastening is made of such a character as to bind.

Q. Or to actually prevent the collapsing?

A. Yes sir.

(Testimony of Horace R. Thayer.)

Q. Would riveting each individual coil be feasible?

A. It would be very expensive.

Q. What would be the effect of cutting rivet holes in the reinforcing?

A. It would lessen the strength of the spiral to that extent. It would practically mean that the spiral would have to be considered as the area with the rivet hole deducted.

Q. The Hyatt patent that you were so extensively examined upon in the Electric Welding record is also shown in the Concrete Steel record is it not?

A. Yes, it is shown in both.

Q. And the Prescott and Bennett patent is also shown in the Concrete Steel Record, is it not?

A. Yes sir.

Q. Has the flat spiral band reinforcing of the Hyatt patent anything in common with present-day coil reinforcing?

A. No, only the form.

Q. Will spacing bars arranged flat to the periphery of the spirals and without a radial extending member make suitable spacers for spiral reinforcing?

A. No.

Q. Why?

A. Because the most economical form of a bar in a column is the square bar, that is, for a given area. If you have a given area to put in, we ought to make it square because that is the form of the greatest strength, or approximately square.

(Testimony of Horace R. Thayer.)

Q. Do you know about the prosecution of patent cases in the Patent Office so as to be able to say what the Patent Office should do or should not do in a given case?

A. No, I do not know very much about it.

Q. Do you regard Vandenburgh's construction as an advance over the art or not?

A. An advance over the art at the time it was gotten out.

Q. Referring now to the Golding patent, page 320, would you say that the means for securing the loops to the longitudinal bar in that case were capable of developing the full strength of the loops or not? What have you to say with regard to that connection?

A. That would depend altogether upon the force that was used in jamming it down. I would think that it might if it was suitably jammed down. One great disadvantage of this type of construction is that it might be a variable quantity. Might be hard to estimate just what the force used was.

Q. As a matter of fact, practically the entire connection between the longitudinal bars and the loops is the frictional engagement due to pressing down of the material on those ends, is it not?

A. Yes sir.

Q. That would not be likely to develop the full strength of the bar?

A. It would be perhaps a question of some doubt.

Q. It would depend something on the material.

(Testimony of Horace R. Thayer.)

Hard steel would be far less likely to produce it than soft steel.

Q. Do you remember the model that was filed in the Electric Welding case as showing the Electric Welding Company's alleged infringing construction.

A. I think I have seen it. I do not remember it clearly, as to just what it was.

Q. What was the character of that model, do you remember?

A. I could not say clearly what it was.

Q. Will you now examine the Kieserling patent page 261?

A. Yes sir.

Q. Is there or is there not anything shown there to indicate the securing the spirals to the longitudinals?

A. Yes, there is a hole through the bar or a kerf through the bar.

Q. And as far as that patent goes there is nothing said about actually securing the spirals to the longitudinals? You said something about imagining that the spiral was fastened. That is pure guesswork upon your part?

A. That was pure guesswork, yes.

MR. GUTHRIE: Was it your judgment of what a man who had some sense would do?

THE WITNESS: That is my idea of the way it ought to be handled, the way I would do it.

Q. That was based purely upon your idea as to what ought to be done in that case?

A. Of what ought to be done.

(Testimony of Horace R. Thayer.)

Q. And not upon what had been done. Looking now to Vandenburgh's reissued patent, suppose the coils of Fig. 6 were about eighteen inches in diameter and six or eight inches in pitch, and were assembled as shown in Fig. 6, would you say that would be a practicable or an impracticable construction?

A. Well, it would carry a load. It would not be as good as the type of column that we put up at the present time.

Q. I will ask you to look at Plaintiff's Exhibit No. 4 and direct your attention to the table on page 27, and ask you to examine the dimensions of the core of the column given at the top of the page, and ask if two small vertical bars were spaced inside the spirals and if they had three-sixteenths of a square inch of defective section, whether or not they would lend any substantial reinforcing in addition to the spirals in such a column as that?

A. It would be very small. Most engineers would ignore it.

Q. What would be the total breaking strain of two such bars in such a column?

A. We would figure, I think, at seventy five hundred pounds per square inch, and then of course they would take away an equal area of the core. That would be equivalent to making them seven thousand pounds to the square inch. That would be roughly three hundred pounds apiece that they would add.

Q. That would be the breaking strain?

A. That would be the safe load. I beg your pardon. What I have given would be the safe load.

(Testimony of Horace R. Thayer.)

Q. The breaking strain?

A. The breaking strain would be about four times as large. Excuse me. I should have said the breaking strain would be about two and one-half times as large instead of four times. That is in compression, you see.

Q. What is the chief advantage of spirals over single bands?

A. They do not have to be joined together at every turn which is a very expensive process and likely to result in weakening the bands.

Q. If you had a whole series of bands, a large number such as are in a building, built with a large number of spirals, would it be likely that all of the joints would be equally good?

A. It would be hard to make them equally good.

Q. Have you ever seen different size spacing bars used on Truscon spirals?

A. I have seen different size longitudinal bars in recent mixups due to freight congestion, I suppose.

Q. What are the sizes.

A. I don't know. They would simply have a lot of different bars. I assume they had taken some patched up orders to fill out. It is not usual to do that, though.

Q. Could or could not any of the Vandenburgh forms of reinforcing be used in part with good effect in columns?

A. Yes sir.

Q. Is it not common to figure columns in nearly

(Testimony of Horace R. Thayer.)

all instances for some eccentric or beam loading?

A. It is quite common, yes sir.

Q. Even though the design of the columns and beams is different, do you regard it possible without any more than the exercise of mere mechanical skill of the art to produce either beams or columns from the Vandenburgh construction?

A. Yes, because he has taken up the construction for both of those forms.

RE CROSS EXAMINATION BY MR. GUTHRIE:

Q. Would you regard Defendant's Exhibit 1 as showing the column hooping construction which would be, and is it in fact from your knowledge of the Truscon construction, collapsible?

A. Yes sir, that is collapsible.

Q. You spoke of the variability of the human element of manual labor in beating down the steel to engage in a hole of the oblique subsidiary loops of Golding. That same thing would be true of the pounding down of the tongues of the Vandenburgh patent also, would it not?

A. Well, but take it in the first place that can be inspected, that is, it is usual to inspect the steel after it is in position, and if it was not done the inspector would know it and know it before pouring was started, whereas in the other case he has no means of getting at it, he does not know whether it is done or not.

(Testimony of Horace R. Thayer.)

Q. That will not cover the matter of its jumping out of the place and loosing its engagement?

A. He can see if the pounding down is not properly done. Furthermore, unless the work is badly slighted, in the system at present used in spirals, the spirals would not be likely to come out, that is, if it was omitted in one or two places the spirals would not be displaced because the others hold it very well.

Q. This matter of the collapsibility of a structure of that kind is partly dependent upon the ratio of the pitch, that is, the distance between the spirals as compared to the diameter of the spirals, is it not?

A. That is one thing. There are quite a number of elements entering into it.

Q. Taking them one at a time, another would be the size of the spirals, would it not?

A. Yes sir.

Q. Another would be the tightness or looseness of the engagement at the kerf?

A. Yes sir.

Q. Now, taking a spiral where the diameter of the spiral is only about twice the distance between the spirals, and assuming that the wire is of such texture that it could not be bent down by force, which would distort it, and then spring back, but that if it was bent down by force which would produce distortion, it would remain, would you consider that a column hooping having a spacing of substantially one half the diameter of the coil itself would be collapsible without distortion?

A. The collapsibility depends on so many things

(Testimony of Horace R. Thayer.)

that an answer to that question would be very difficult. For instance, a spiral that theoretically would not be collapsible would be readily collapsed by distorting the structure sometimes.

Q. I am asking you to eliminate distortion and to assume that the spirals are spaced about one half the diameter of the spiral. I am asking you whether such a continuous spiral, continuous in one direction, I mean, could be collapsed and restored without distortion in the process, at that spacing?

A. Well, I take it my impression would be that unless you assume some distortion you could not get collapsibility in any case. It involves some little distortion, but in an ordinary spiral the distortion of it is so small that it is negligible and very easily accomplished.

Q. That is because of the close spacing?

A. Yes sir.

Q. But take the spacing of one-half in length longitudinally to the diameter of the coil, you could not with the materials that we ordinarily have collapse that coil and restore it without a distortion that would be more than negligible, could you?

A. Well, I would imagine you could. If you have ever been on actual work, you know that some of the stuff that comes from the mill comes in very, very poor shape and some of it is badly bent and battered out of shape, but unless it is broken or something of the kind, they always hammer it back and put it in again.

Q. I will put it in another way. If the spacing

(Testimony of Horace R. Thayer.)

longitudinally was one half of the diameter of the coil, you could not collapse it without seriously distorting the material and the distortion would have to be remedied before it would be in good shape for use, would it not?

A. I would think so, for ordinary commercial sizes.

MR. GUTHRIE: Defendant offers in evidence as part of the deposition, as Defendant's Exhibit 7, those of the subsequent patents identified by the witness Thayer as being substantially the same construction as that he says is in Vandenburgh, not already introduced in evidence, those introduced being Burk, No. 1,016,319, Bindlay and Mogan, No. 1,115,490, Turner, No. 1,159,297, and Hough, No. 1,172,026. Also certified copies of the file wrapper and contents of the McClure and Wedmore patents offered in evidence yesterday, but not appearing to be identified as exhibits, and they are now offered as defendant's Exhibit 8.

The file wrappers of patents subsequent to the patent in suit, including references made by the patent Office as against claims presented, nowhere contain any reference to the patent in suit as a reference affecting the claims allowed in such subsequent patents.

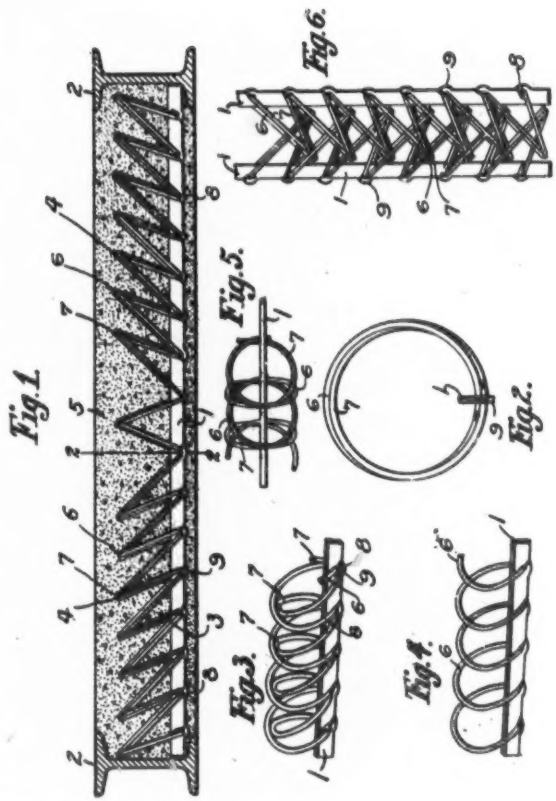
208

G. E. VANDENBURGH.

REINFORCING BAR.

APPLICATION FILED JULY 1, 1916.

Reissued Aug. 15, 1916. 14,182.



INVENTOR.
George E. Vandenburgh.

BY
Carlos P. Griffin
ATTORNEY.

UNITED STATES PATENT OFFICE.

GEORGE E. VANDENBURGH, OF SAN FRANCISCO, CALIFORNIA.

REINFORCING-BAR.

14,182. Specification of Reissued Letters Patent. Reissued Aug. 13, 1916.

Original No. 841,741, dated January 22, 1907, Serial No. 315,889. Application for reissue filed July 1, 1916. Serial No. 107,208.

To all whom it may concern:

Be it known that I, GEORGE E. VANDENBURGH, a citizen of the United States, and recently of Washington, District of Columbia, and now residing at San Francisco, California, have invented certain new and useful Improvements in Reinforcing-Bars, of which the following is a specification, reference being had therein to the accompanying drawings.

This invention relates to a reinforcing-bar particularly adapted for cement and concrete construction wherein the bar is embedded in the plastic body to be supported thereby.

The invention has for an object to provide a reinforcing-bar with one or more spirally-disposed coils secured to the bar so as to provide an extended area of contact adapted to resist strain longitudinally and laterally of the bar and to form a truss within the body of concrete or other plastic material which provides the maximum of supporting strength in the arch or surface to be formed.

Other and further objects and advantages of the invention will be hereinafter set forth, and the novel features thereof defined by the appended claims.

In the drawings, Figure 1 is a vertical section showing the bar applied to supporting girders or beams. Fig. 2 is an enlarged vertical section on the line 2—2, Fig. 1. Fig. 3 is a detail perspective of the primary and secondary coils shown in Fig. 1. Fig. 4 is a similar view of a modified form using one coil. Fig. 5 is a detail plan of the form shown in Fig 3, and Fig. 6 is an elevation of two meshing coils used for girder and column construction.

Like numerals of reference indicate like parts in the several figures of the drawings.

The numeral 1 designates a bar which may be of any desired construction or configuration and supported in any preferred manner. For instance, when used in arch construction it is adapted to rest upon the base of the beams or girders 2 sufficiently above the lower surface thereof to provide for the facing of the concrete or cement with the lower face of the bar. The coils are applied to the bar in any desired manner so as to surround the coils and bar and embed the same therein to form a truss construction.

The bar may be provided with a primary coil 6, extending in one direction, as shown in Fig. 4, which is sufficient in light construction; but when a heavier construction is to be used a secondary coil 7 is provided, which extends in the opposite direction to the coil 6 and through the same so as to cross beneath the coil 6 at a point directly above the bar, thus providing a construction in which all lateral pull or strain of the coil is avoided, owing to the equalization thereof by the oppositely-extending coils and the tendency of the coils to move or flatten toward the face of the bar resisted. This preferred construction is shown in Figs. 1 and 3, and it is also desirable that both of the coils be deflected away from the center of the bar, as shown in Fig. 1, as the greatest supporting strain carried by the arch is at the center thereof, and this deflection therefore resists such strain and tends to draw the coils upward into a position at right angles to the bar.

As a preferred means of securing the coils to the bar I have shown a series of kerfs 8 in one face of the bar inclined away from the center of the bar toward the opposite ends thereof, and the coils are seated within these kerfs and held therein by means of the integral spurs 9, which are forced downward upon the coils when inserted and permanently retain them in position.

In Fig. 6 a modified application of the invention is shown where two of the bars are disposed parallel to each other, with their coils intermeshing, for use in column or girder construction, wherein such a construction provides the maximum of strength with the minimum of weight in the reinforcing material.

In the operation of the invention it will be seen that the bar supporting the coil resists any movement thereof longitudinally of the bar and provides the necessary strength upon which the truss structure formed by the coils is carried. These coils being extended in opposite directions and embedded in the material provide the maxi-

weight and quantity of material, as owing to their opposite direction of curvature they effectually oppose the strain placed thereon, while their deflection toward the opposite ends of the bar resists the central downward strain of the arch.

It will be seen that this form of bar is very simple and economical in construction while embodying the greatest efficiency in use. This bar, although described in connection with arch and column construction, is adapted for use in any character of metal, reinforced concrete, or cement construction.

Having now described my invention and set forth its merits, what I claim, and desire to secure by Letters Patent, is—

1. A concrete reinforcing consisting of a bar having a plurality of integral spurs, and a spiral coil permanently secured thereto by having the spurs bent down on the several coils, the coils extending beyond and free of the bar at the opposite side therefrom to the securing point.

2. A concrete reinforcing consisting of a bar having integral means to secure a coil thereto, and a spiral coil permanently secured to the bar in each convolution and extended beyond and free of said bar at the opposite side therefrom to the securing point.

3. A reinforcing-bar provided upon one edge with a series of kerfs each having an integral overlapping spur, and a coil disposed in said kerfs, each convolution thereof being retained beneath one of said spurs.

4. In a reinforcing-bar, a spiral coil permanently secured thereto by spurs bearing on each convolution thereof and extended beyond and free of said bar at the opposite side therefrom to the securing-point, said coils being deflected in opposite directions from the center of the bar toward the ends thereof.

5. A reinforcing-bar provided upon one edge with a series of kerfs disposed diagonally to the length of the bar each having an overlapping integral spur projected toward the center of the bar, and a coil disposed in said kerfs and retained beneath said spurs.

6. A reinforcing bar provided with a spirally-disposed coil secured thereto and extended free of said bar, and a secondary spirally-disposed coiled strand secured to the bar and extending in the opposite direction to the first mentioned coil.

7. A reinforcing-bar provided at opposite sides of its center with spiral coils secured thereto and deflected in opposite directions from the center of the bar, and a secondary spiral coil secured to the bar and extended in the opposite direction to the first-mentioned coil throughout the length thereof.

In testimony whereof I have hereunto set my hand this 24th day of June, 1916.

GEORGE E. VANDENBURGH.

No. 841,741. PATENTED JAN. 22, 1907.

G. E. VANDENBURGH.

REINFORCING BAR.

APPLICATION FILED MAY 8, 1906.

Fig. 1.

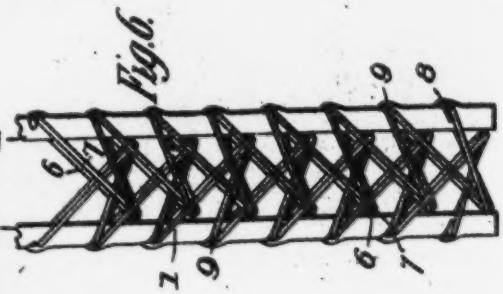


Fig. 6.

Fig. 5.

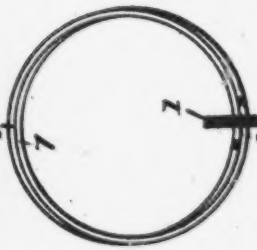


Fig. 2.

Fig. 3.

Fig. 4.

WITNESSES:

H. G. Coyle.

Alfred I. Gage

INVENTOR

George E. Vandenburgh,

BY E. B. Stocking

Attorney

UNITED STATES PATENT OFFICE.

GEORGE E. VANDENBURGH, OF WASHINGTON, DISTRICT OF COLUMBIA.

REINFORCING-BAR.

No. 841,741. Specification of Letters Patent. Patented Jan. 22, 1907.

Application filed May 9, 1906. Serial No. 315,959.

To all whom it may concern:

Be it known that I, GEORGE E. VANDENBURGH, a citizen of the United States, residing at Washington, District of Columbia, have invented certain new and useful Improvements in Reinforcing-Bars, of which the following is a specification, reference being had therein to the accompanying drawings.

This invention relates to a reinforcing-bar particularly adapted for cement and concrete construction wherein the bar is embedded in the plastic body to be supported thereby.

The invention has for an object to provide a reinforcing-bar with one or more spirally-disposed coils secured to the bar so as to provide an extended area of contact adapted to resist strain longitudinally and laterally of the bar and to form a truss within the body of concrete or other plastic material which provides the maximum of supporting strength in the arch or surface to be formed.

Other and further objects and advantages of the invention will be hereinafter set forth, and the novel features thereof defined by the appended claims.

In the drawings, Figure 1 is a vertical section showing the bar applied to supporting girders or beams. Fig. 2 is an enlarged vertical section on the line 2 2, Fig. 1. Fig. 3 is a detail perspective of the primary and secondary coils shown in Fig. 1. Fig. 4 is a similar view of a modified form using one coil. Fig. 5 is a detail plan of the form shown in Fig. 3, and Fig. 6 is an elevation of two meshing coils used for girder and column construction.

Like numerals of reference indicate like parts in the several figures of the drawings.

The numeral 1 designates a bar which may be of any desired construction or configuration and supported in any preferred manner. For instance, when used in arch construction it is adapted to rest upon the base of the beams or girders 2 sufficiently above the lower surface thereof to provide for the facing of the concrete or cement beneath the lower face of the bar. The coils 4 are secured to the bar in any desired manner—for instance, as hereinafter described—and the plastic material or cement-filling 5 applied so as to surround the coils and bar and embed the same therein to form a truss construction.

The bar may be provided with a primary coil 6, extending in one direction, as shown in Fig. 4, which is sufficient in light construction; but when a heavier construction is to be used a secondary coil 7 is provided, which extends in the opposite direction to the coil 6 and through the same so as to cross beneath the coil 6 at a point directly above the bar, thus providing a construction in which all lateral pull or strain of the coil is avoided, owing to the equalization thereof by the oppositely-extending coils and the tendency of the coils to move or flatten toward the face of the bar resisted. This preferred construction is shown in Figs. 1 and 3, and it is also desirable that both of the coils be deflected away from the center of the bar, as shown in Fig. 1, as the greatest supporting strain carried by the arch is at the center thereof, and this deflection therefore resists such strain and tends to draw the coils upward into a position at right angles to the bar.

As a preferred means of securing the coils to the bar I have shown a series of kerfs 8 in one face of the bar inclined away from the center of the bar toward the opposite ends thereof, and the coils are seated within these kerfs and held therein by means of the integral spurs 9, which are forced downward upon the coils when inserted and permanently retain them in position.

In Fig. 6 a modified application of the invention is shown where two of the bars are disposed parallel to each other, with their coils intermeshing, for use in column or girder construction, wherein such a construction provides the maximum of strength with the minimum of weight in the reinforcing material.

In the operation of the invention it will be seen that the bar supporting the coil resists any movement thereof longitudinally of the bar and provides the necessary strength upon which the truss structure formed by the coils is carried. These coils being extended in opposite directions and embedded in the material provide the maximum strength to resist either lateral or longitudinal pressure with the minimum weight and quantity of material, as owing to their opposite direction of curvature they effectually oppose the strain placed thereon, while their deflection toward the opposite ends of the bar resists the central downward strain of the arch.

It will be seen that this form of bar is very simple and economical in construction,

while embodying the greatest efficiency in use. This bar, although described in connection with arch and column construction, is adapted for use in any character of metal, reinforced concrete, or cement construction.

Having now described my invention and set forth its merits, what I claim, and desire to secure by Letters Patent, is—

1. In a reinforcing-bar, a spiral coil rigidly secured thereto at two points in each convolution thereof and extended beyond and free of said bar at the opposite side therefrom to the securing-point.

2. In a reinforcing-bar, a spiral coil rigidly secured thereto at two points in each convolution thereof and extended beyond and free of said bar at the opposite side therefrom to the securing-point, said coils being deflected in opposite directions from the center of the bar toward the ends thereof.

3. A reinforcing-bar provided upon one end with a series of kerfs each having an integral overlapping spur, and a coil disposed in said kerfs, each convolution thereof being retained beneath one of said spurs.

4. A reinforcing-bar provided upon one edge with a series of kerfs disposed diagonally to the length of the bar each having an overlapping integral spur projected toward the center of the bar, and a coil disposed in said kerfs and retained beneath said spurs.

5. A reinforcing-bar provided with a spirally-disposed coil secured thereto and extended free of said bar, and a secondary spirally-disposed coiled strand secured to the bar and extending in the opposite direction to the first-mentioned coil.

6. A reinforcing-bar provided at opposite sides of its center with spiral coils secured thereto and deflected in opposite directions from the center of the bar, and a secondary spiral coil secured to the bar and extended in the opposite direction to the first-mentioned coil throughout the length thereof.

In testimony whereof I affix my signature in presence of two witnesses.

GEORGE E. VANDENBURGH.

Witnesses:

ALFRED T. CAGE,

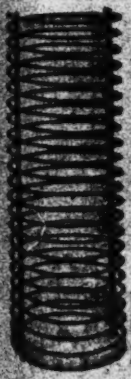
JOHN L. FLETCHER.

Plaintiff's Exhibit No. 4. Pages 26 and 27

Kahn Building Products

Stack of Column Hooping (collapsed) ready for shipment. Note compactness and simplicity.

COLLAPSIBLE COLUMN HOOPING



Collapsible Column Hooping, for reinforcing concrete columns, is shipped in the form of flat, circular coils of exact diameter and accurately spaced by means of special spacing bars. These coils spring automatically into a complete hooped column on cutting the small fastening wires.

Rib Bars are ordinarily used as vertical reinforcements in conjunction with Column Hooping.

Sizes of Collapsible Column Hooping

Shipped complete with two spacing bars.

Sizes of wire for hooping: [illegible]-inch, 5/16-inch, ⅜-inch, 7/16-inch and ½-inch diameter.

Diameter of Coils: 9-inch to 36-inch.

Pitch: 1½-inch to 12-inch.

Hooping, where desired, can also be furnished in bundles, coiled to the correct diameter, and with separate spacing bars, ready for assembling in the field.

See Table of Safe Loads Carried on Hooped Columns on next page.

Truscon Concrete Steel Co., Youngstown, Ohio

SAFE LOADS CARRIED BY HOOPED COLUMNS

Safe Loads in Pounds	Outside Diameter	Core Diameter	Number of Vertical	Size of Vertical	Size of Hooping Wire Diameter	Pitch of Hooping Centers
[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]

[illegible]

SAS

Washington, D. C.

Sir, you are invited to be present at

The New Freedman's Hospital Building,

Monday, June 25th, 1906, at 3 o'clock P. M.

to witness a

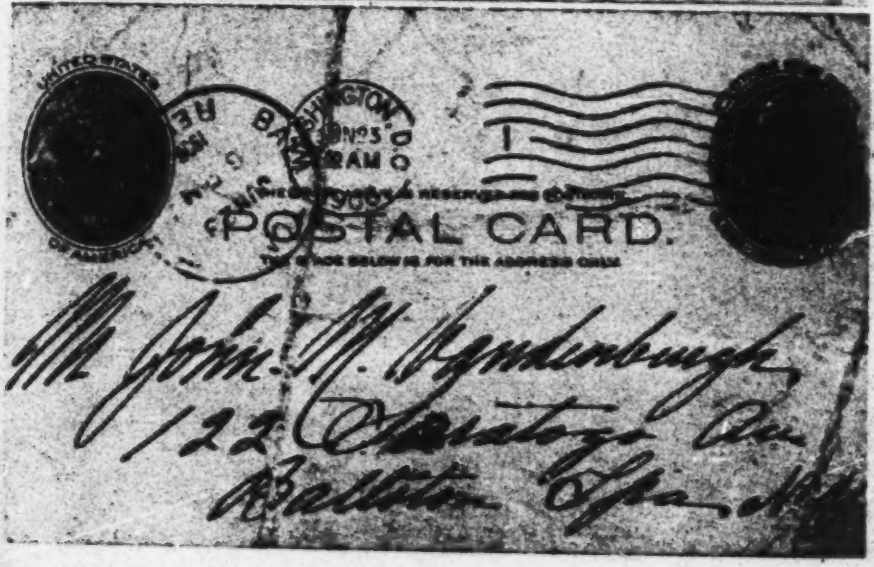
Crushing Test of the Vandenburgh Reinforced Concrete System,

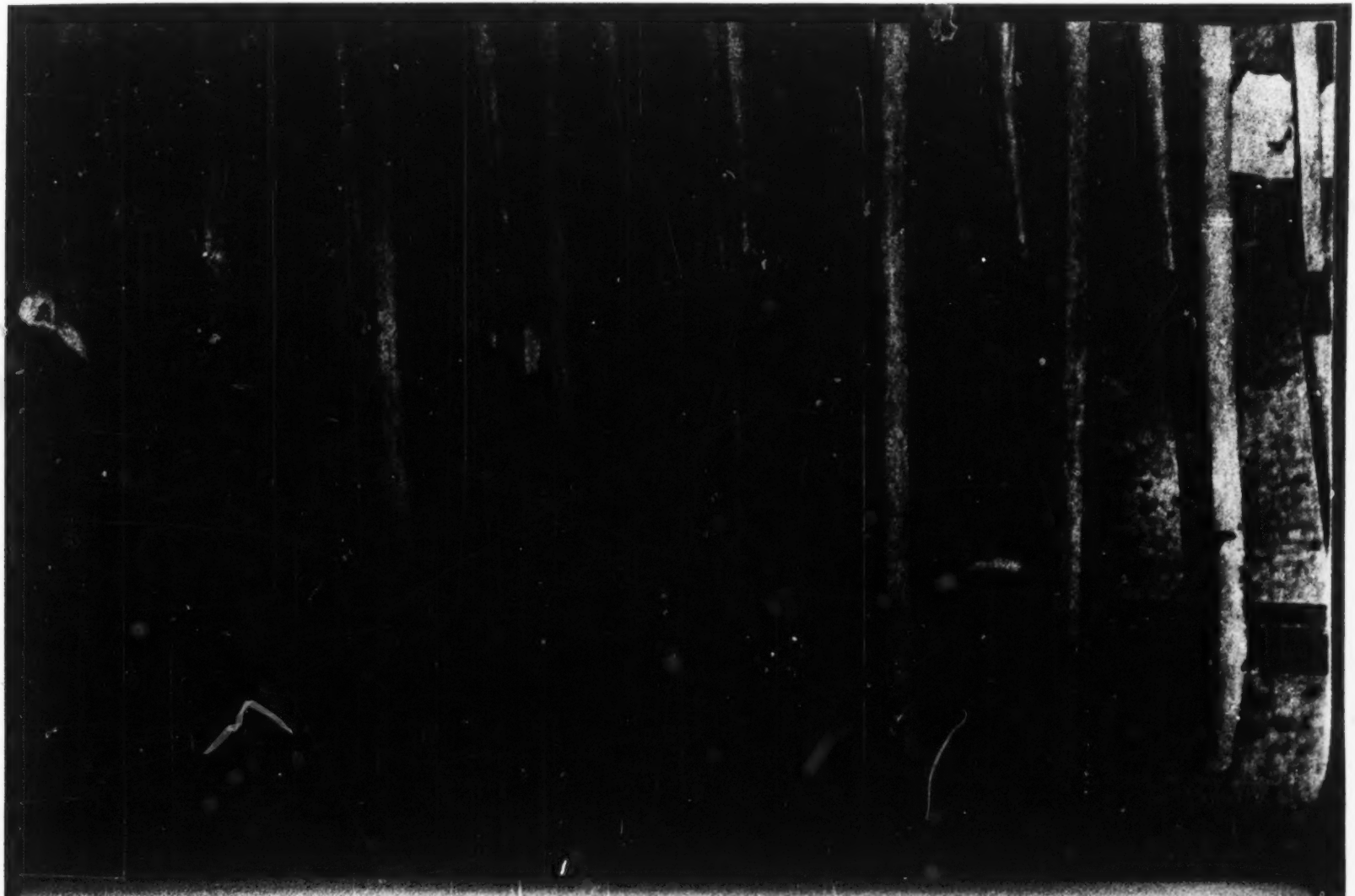
made by the Computing Engineers of the Building Department

No.

Respectfully,

Benjamin Blethyn.



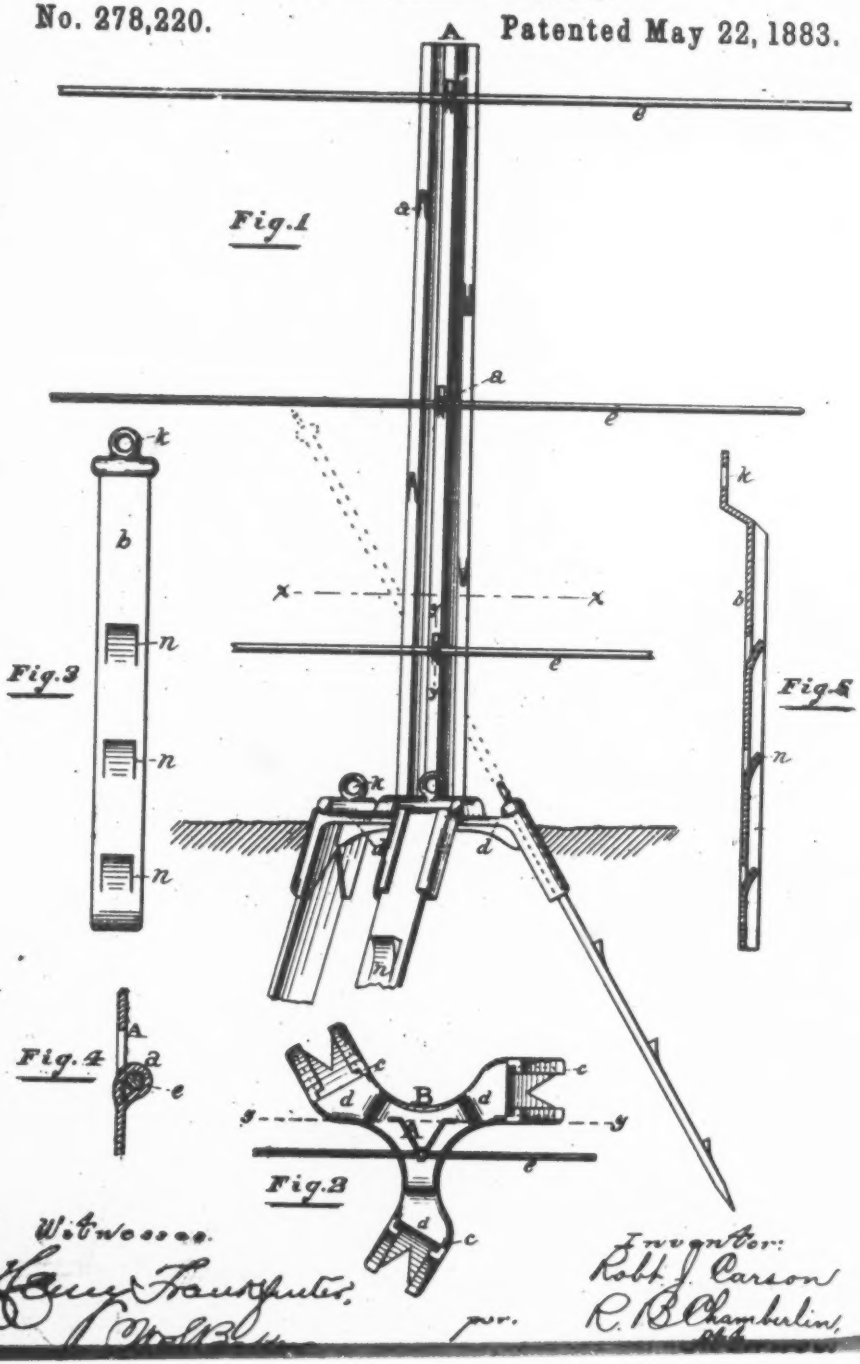


(No Model.)

R. J. CARSON.

IRON OR STEEL FENCE POST.

No. 278,220. Patented May 22, 1883.



Witnesses.

Inventor:
Robt. J. Carson
per. R. B. Chamberlin,

UNITED STATES PATENT OFFICE.

ROBERT J. CARSON, OF CHICAGO, ASSIGNOR OF ONE-HALF TO EDWARD RUTZ, OF SPRINGFIELD, ILLINOIS.

IRON OR STEEL FENCE-POST.

SPECIFICATION forming part of Letters Patent No. 278,290, dated May 22, 1883.

Application filed April 24, 1883. (No model.)

To all whom it may concern:

Be it known that I, ROBERT J. CARSON, of Chicago, in the county of Cook and State of Illinois, have invented certain new and useful Improvements in Iron or Steel Fence-Posts; and I do hereby declare the following to be a full, clear, and exact description of the invention, such as will enable others skilled in the art to which it pertains to make and use it, reference being had to the accompanying drawings, which form part of this specification.

My invention relates to an improvement in fence-posts, being particularly designed for the construction of barbed-wire fences; and it consists of a post that is formed from sheet metal, that is secured to a base having radial arms, which arms have at their outer ends downwardly-projecting annular bearing-grooves, in combination with pegs or braces of suitable construction, that are adapted to be driven through the grooves and into the ground for securing the posts thereto, the posts being provided with suitable means for attachment of the barbed wire, as will be more fully described hereinafter.

In the accompanying drawings, Figure 1 is a side elevation of a fence-post with its attachments complete. Fig. 2 is a cross-section on the line X X of Fig. 1. Figs. 3, 4, and 5 are detail views.

A represents a post formed of sheet metal, of any suitable thickness, and which is preferably triangular in cross-section, as shown in Fig. 2. This post is secured in any suitable manner to the base-plate B, which base-plate has projecting from it the radial arms D, the outer ends of which are inclined at a suitable angle downward, and have their inner sides in a line with the adjacent side of the angle formed by the post, as shown at Y Y, Fig. 2. These downwardly-turned projections are provided with a suitable groove, *c*, which adapts them to receive the pegs *b*, that are adapted to be driven through them and forced into the ground for securing the post in position. In order to anchor these pegs more firmly in position when driven into the ground, they are provided with barbs *a*, which may be either stamped out from the pegs, (which are preferably made of flat sheet metal,) or they may be cast thereon, if preferred. The tops of these pegs have secured to them the rings K, through which a crow-bar may be passed to secure leverage when it is desired to draw the pegs from the ground in order to remove the post. In order to secure the barb-wires to the post, I provide the post with ears *a*, which may be stamped therefrom or riveted thereto, and which ears are adapted to be bent over the wire *e*, as shown in Fig. 4.

A fence-post thus constructed is light, and is cheaply made, will be found exceedingly durable, and may easily be removed, after having been put in position, when it is desired to move the fence.

Having thus described my invention, I claim—

1. The combination of a fence-post of suitable construction, a base-plate, B, provided with radial arms *d*, turned-down ends having grooves *c* formed in them, and pegs *b*, that are adapted to secure the base-plate in position by being driven through the grooves, with which they are provided, into the ground, substantially as described.

2. The combination of the post A, formed of sheet metal, and provided with ears *a* for securing the wires thereto, a base-plate, B, having radial arms *d*, and the turned-down ends having grooves *c*, these ends being arranged so as to have their inner sides in a line with the adjacent side of the fence-post, and pegs *b*, that are adapted to be driven through the grooves and into the ground for securing the base-plate in position, the said pegs being provided with barbs, substantially as set forth.

In testimony whereof I affix my signature in presence of two witnesses.

ROBERT J. CARSON.

Witnesses:
A. B. TALLMAN,
WILLIAM H. MCGUIRE.

B. F. RANDALL.

SHEET METAL FENCE POST.

No. 349,603. Patented Sept. 21, 1886.

Fig. 1.

Fig. 2.

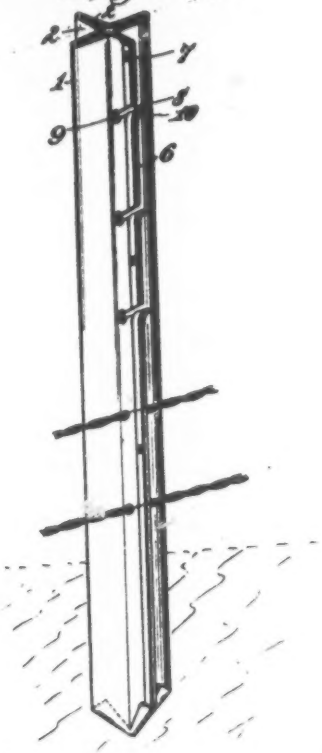


Fig. 3.

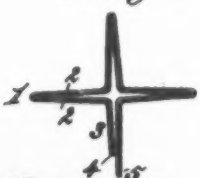


Fig. 4.

Fig. 5.

Witnesses.
Robt Errett
J. A. Rutherford

Inventor.
Benjamin F. Randall.
By James L. Norris.
Atty

UNITED STATES PATENT OFFICE.

BENJAMIN F. RANDALL, OF FALL RIVER, MASSACHUSETTS.

SHEET-METAL FENCE-POST.

SPECIFICATION forming part of Letters Patent No. 349,603, dated September 21, 1886.

Application filed July 15, 1886. Serial No. 208,095. (No model.)

To all whom it may concern:

Be it known that I, BENJAMIN F. RANDALL, a citizen of the United States, residing at Fall River, in the county of Bristol and State of Massachusetts, have invented new and useful Improvements in Sheet-Metal Fence-Posts, of which the following is a specification.

The object of my invention is to provide a novel and comparatively inexpensive metallic post for erecting wire fences, which will require no painting, is strong but light, can be easily driven in the ground, is substantial when in place, and the wire strands can be secured thereto in a very simple manner.

To such ends my invention consists in a fence-post consisting of a single sheet of galvanized metal bent, folded, and creased into cruciform shape in cross-section, constituting radial flanges each comprising two parallel thicknesses of the metal, the longitudinal ends of the sheet of metal comprising one flange being lapped or bent one around the other and united together to form a bead, said beaded flange having slots extending from the edge inward the full depth of the flange, in such manner that when the wire strands are introduced into the slots and confined in place they will have bearing against two of the radial flanges at opposite sides of the flange to which they are attached.

The invention consists of other features, which will be hereinafter described and claimed, reference being made to the accompanying drawings illustrating the invention, in which—

Figure 1 is a perspective view of my improved metallic fence-post, showing the same prior to one longitudinal edge of the sheet metal being folded around the other edge, and before the lower ends of the flanges are folded on inclined lines to produce the pointed end; Fig. 2, a perspective view of the post complete, showing two wire strands secured in place; Fig. 3, a transverse sectional view of Fig. 1; Fig. 4, a transverse sectional view of Fig. 2; Fig. 5, a perspective view of a wooden cap-piece for the post.

In order to enable those skilled in the art to make and use my invention, I will now describe the same in detail. I first provide a rectangular sheet of galvanized sheet metal, and by appropriate mechanism bend and fold the same to form longitudinal creases, 1, and in such manner as to constitute four radial flanges, making the post cruciform in cross-section, each flange comprising two parallel thicknesses, 2 2, of the sheet of metal. The longitudinal edges of the metal sheet which comprise one flange, 3, are so formed that one edge extends beyond the outer edge, 4, thereby constituting a flange or lip, 5, which is subsequently folded around and upon the edge 4, forming a bead, 6, as shown in Figs. 2 and 4. To permanently secure the flange or lip it is riveted, as at 7; but obviously it may be soldered instead of riveted, it only being essential to firmly and permanently secure it in place. The construction is such that all the creases 1 are brought into close proximity to each other at the axis of the post, just leaving sufficient space to receive the tongue of a wooden block, hereinafter referred to. The construction is such that by lapping the longitudinal flange or lip 5 around the other edge 4 the flange 3 becomes somewhat less in width than the other flanges. The lower end of the post is pointed so that it can be readily driven into the ground by folding the two thicknesses 2 2 of each flange on an inclined line, as indicated by the dotted lines *a*, Fig. 1, such folded parts being pressed down upon their respective flanges, thereby bringing the lower end of the post into the form shown in Fig. 2, so that the penetrating end comprises a hemmed edge of thickness of metal, to provide the strength requisite in driving the post into place. The folding or hemming of the ends also provides closed inclined edges for penetrating the ground, so that no earth can enter between the thicknesses comprising the radial flange. The post being formed as set forth, the short beaded flange 3 is slitted at several points along its length, as at 8, which slits extend the complete width of the flange and terminate at their inner ends in orifices 9 to receive the wire strands. The slits are preferably arranged at an angle to form lips 10, which can be bent laterally from the face of the flange to permit the insertion of the wire strands into the orifices 9, after which the lips 10 are restored to their original position by suitable means, thereby confining the wires in place. To further secure the wires I solder them to the post at the orifices 9, or attach the strands to the post

by a piece of galvanized wire securely wound around the strand on both sides of the flange, one end of said wire being passed through the hole below and the two ends tightly twisted together. It will be observed that as the wire receiving and holding orifices are at the base of the short flange, the wire strands have bearing against two of the other radial flanges at opposite sides, respectively, of the short flange, thereby materially and substantially increasing the stability of the fence when erected. The slits by passing through the beaded edge of the flange 3 constitute strong and to some extent rigid lips 10, which is of advantage in that they are not liable to be accidentally moved laterally, which would permit the wire strand to be misplaced from its seat. By employing galvanized sheet metal I provide a metallic post which requires no painting, and the entire construction provides a post which is light, but substantial, and which can be readily driven into the ground and easily removed therefrom when necessary.

It is sometimes desirable and necessary to use a top wooden or similar rail upon barbed wire fences, and to admit this I employ a wooden block, 11, Fig. 5, having a wedge-shaped tongue, which is inserted in the open top of the post, and to which may be nailed a strip of board, for the purpose of turning stock without injury at night.

What I claim is—

1. A fence-post consisting of a sheet of metal bent, folded, and creased to form radial flanges, each comprising two parallel or approximately parallel thicknesses of the metal with the longitudinal ends of the sheet metal comprising one flange bent around the other and firmly secured in place, the lower ends of the flanges being bent on inclined lines and folded down upon said flanges to form hems and a pointed end to the post, substantially as described.

2. A fence-post consisting of a sheet of metal bent, folded, and creased to form radial flanges, each comprising two parallel or approximately parallel thicknesses of the metal with the longitudinal ends of the sheet metal comprising one flange bent one around the other and firmly secured to form a beaded flange, said beaded flange having slits extending its full width to receive the wire strands, whereby the latter have bearings against two of the radial flanges at opposite sides of the slitted flange, substantially as described.

3. A fence-post consisting of a sheet of metal bent, folded, and creased to form radial flanges, each comprising two parallel or approximately parallel thicknesses of the metal with the longitudinal ends of the sheet metal comprising one flange bent one around the other and firmly secured to form a beaded flange having slits extending its full length to receive the wire strands, said flanges having one of their ends folded on inclined lines to form a hemmed pointed end, substantially as described.

4. A metallic post consisting of a sheet of metal bent, folded, and creased to form radial flanges, each comprising two parallel or approximately parallel thicknesses of the metal, said flanges being folded at one end on inclined lines to form a hemmed pointed end, substantially as described.

In testimony whereof I affix my signature in presence of two witnesses.

BENJAMIN F. RANDALL.

Witnesses:

JOHN N. BURGESS,

HENRY H. EARL.

(No Model.)

L. B. HARMON & J. N. NUTT.

FENCE POST.

No. 380,627. Patented Apr. 3, 1888.

Fig. 1.

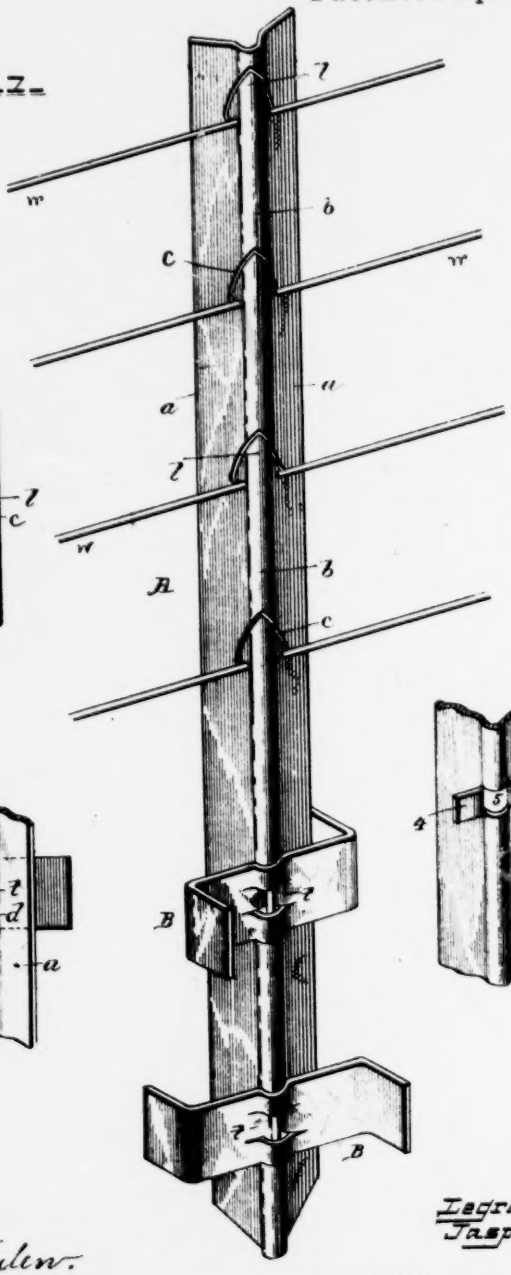


Fig. 4.

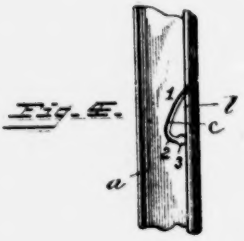


Fig. 2.

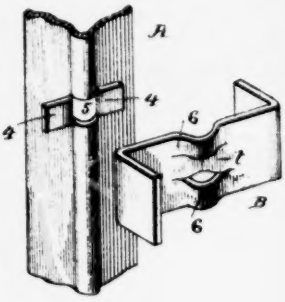
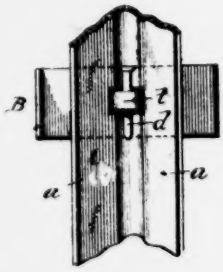


Fig. 3.



Witnesses

Albert Speulen.

Robert Owens,

Inventors

Legrand B. Harmon.

Jasper N. Nutt.

By their Attorneys

Anderson & Mason.

UNITED STATES PATENT OFFICE.

LEGRAND B. HARMON, OF CARYSVILLE, AND JASPER N. NUTT, OF SIDNEY, OHIO.

FENCE-POST.

SPECIFICATION forming part of Letters Patent No. 380,627, dated April 3, 1888.

Application filed January 30, 1888. Serial No. 262,620. (No model.)

To all whom it may concern:

Be it known that we, LEGRAND B. HARMON, of Carysville, Champaign county, Ohio, and JASPER N. NUTT, of Sidney, Shelby county, Ohio, citizens of the United States of America, have invented certain new and useful Improvements in Fence-Posts, of which the following is a specification, reference being had therein to the accompanying drawings.

Our invention relates to fence-posts for wire fences; and it consists in certain details of construction, which will first be described in connection with the accompanying drawings, and then pointed out in the claims.

Figure 1 of the drawings is a perspective view of our post with two anchors attached. Fig. 2 is a perspective view of an anchor and a portion of the post. Fig. 3 is a rear elevation of a portion of the post with an anchor attached. Fig. 4 is a side view of a portion of the post, illustrating the wire-receiving kerfs.

Referring to the drawings, A represents the post, stamped up from metal, and for the purpose of description it may be said to be V-shaped in cross-section. The front edge of the post, however—that is to say, the edge to which the sides *a a* converge—is rolled up into a nearly half-round bead, *b*, the function of which bead, aside from giving strength to the post, will be presently explained.

For the purpose of attaching the fence-wires *w* to the post, we cut kerfs *c* in its front edge, which kerfs incline downward and rearward, as at 1, then forward, as at 2, and finally terminate in perforations, as at 3, Fig. 4, in which latter the wires are to be inserted. It will be noticed that these wire-receiving perforations 3 are located at the rear of bead *b*, and that consequently the lip *l*, formed by the kerf, will, owing to the comparative rigidity of the bead, be caused to spring back with considerable force after the wire has been passed down through the kerf and forward into the perforation, whereby the wire will be securely held without the interposition of wedges or other like devices, it being understood that the diameter of the perforation is somewhat less than that of the wire; and it will also be noticed that by reason of the bead we are enabled to make this very desirable form of kerf without cutting so deep into the post as to materially weaken it.

For the purpose of maintaining the post in an erect position when in the ground, we employ one or more anchors, B, removably secured to the front edge of the post. This anchor we prefer to make in the form shown in the drawings—that is to say, by bending the respective ends of a rectangular piece of metal in opposite directions. An anchor of this form, when attached to the post, offers greatly-increased resistance to deflection of the post in any and all directions, as will be readily apparent on inspection of Fig. 1 of the drawings.

In order to attach the anchor to the front edge of the post, and at the same time to give it a broad bearing, so that it cannot swing out of position, we cut two transverse slits through the bead on the post and a short distance into the sides *a a*, and then sever the intermediate portion by a vertical cut down the center of the bead, after which we bend back each severed portion into a position at right angles to the axis of the post, thus forming bearings or anchor-braces 4 and leaving an opening, 5, for the reception of the tongue on the anchor. This tongue *t* is formed by cutting two parallel slits, 6, in the anchor and bending the intermediate portion rearward into concave form, as viewed from the front, and the other portions on each side of the tongue into convex form, so that while the tongue passes rearwardly through the opening 5 in the post the convex parts will fit neatly around the bead. A wedge, *d*, or other suitable device is then inserted between the tongue and the rear side of the bead, as seen in Fig. 3, which serves to key the anchor to the post.

One anchor will generally be found sufficient to secure the post; but two or more may be used if the nature of the soil demands them.

By the above description our invention is clearly distinguished from the V-shaped post having oblique kerfs cut across its front edge, which kerfs terminate directly in apertures for the reception of the wire, for by that construction there is little or no resiliency in the lip, and therefore, in order to hold the wire firmly,

it has been found necessary to either wrap it around posts at intervals or to secure it to each post by means of wedges and like devices.

We are aware that an anchor made from a rectangular piece of metal with its ends bent in opposite directions from each other is not new; but we believe we are the first to combine this desirable form of anchor with a beaded V-shaped post.

Having thus described our invention, what we claim as new, and desire to secure by Letters Patent, is—

1. A metallic V-shaped fence-post with an approximately semi-cylindrical bead on the edge formed by the meeting of the sides, having a series of wire-securing lips on said edge, the said lips being formed by downwardly and rearwardly inclined and forwardly-extending kerfs terminating in perforations in rear of the bead, substantially as described.

2. The combination, with a V-shaped metallic fence-post having an approximately semi-cylindrical bead on the edge formed by the meeting of the sides, an opening through said beaded edge, and an anchor-brace integral with the post on each side of said opening, of an anchor having a rearwardly-extending tongue to pass through the opening in the post and a key or other suitable device to pass between the tongue and the rear side of the bead, substantially as described, and for the purposes stated.

3. The combination, with a V-shaped metallic fence-post having an approximately semi-cylindrical bead on the edge formed by the meeting of the sides, an opening through said beaded edge, and an anchor-brace integral with the post on each side of said opening, of an anchor formed from a rectangular piece of metal having its ends bent in opposite directions and having an integral rearwardly-extending tongue to pass through the opening in the post, and a key or other suitable device to pass between the tongue and the rear side of the bead, substantially as described, and for the purposes stated.

In testimony whereof we affix our signatures in presence of two witnesses.

LEGRAND B. HARMON.
JASPER N. NUTT.

Witnesses:
H. WILSON,
B. W. GILFILLAN.

No Model.)

S. B. SALSICH.

FENCE POST.

No. 417,397. Patented Dec. 17, 1889.

Fig. 1.

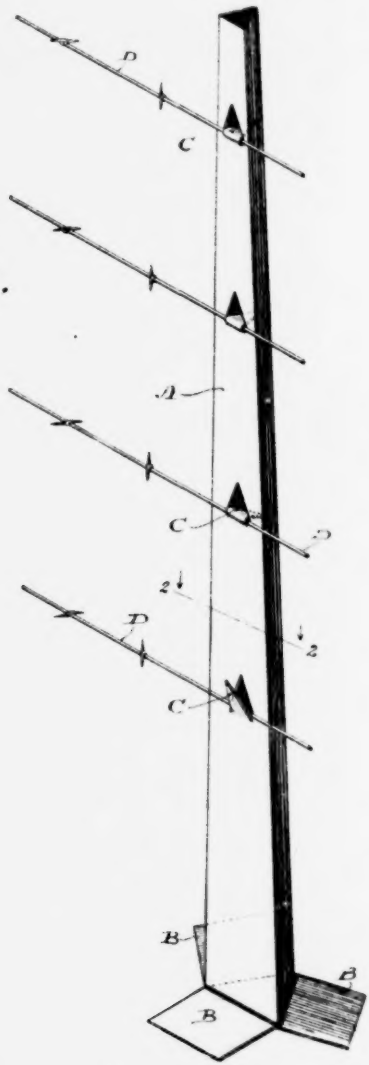
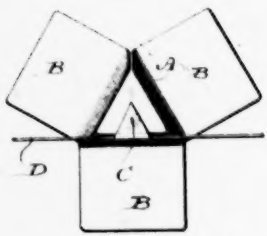


Fig. 2.



Witnesses
Geo. W. Young.
N. E. Oliphant

Inventor
Sherman B. Salsich
By Stout Underwood
Attorneys

UNITED STATES PATENT OFFICE.

SHERMAN B. SALSICH, OF MILWAUKEE, ASSIGNOR OF ONE-HALF TO WILLIAM E. RUSSELL, OF HARTLAND, WISCONSIN.

FENCE-POST.

SPECIFICATION forming part of Letters Patent No. 417,397, dated December 17, 1889.

Application filed December 10, 1888. Serial No. 293,202. (No model.)

To all whom it may concern:

Be it known that I, SHERMAN B. SALSICH, of Milwaukee, in the county of Milwaukee, and in the State of Wisconsin, have invented certain new and useful Improvements in Fence-Posts; and I do hereby declare that the following is a full, clear, and exact description thereof.

My invention relates to posts for wire fences; and it consists in certain peculiarities of construction and combination of parts, to be hereinafter described with reference to the accompanying drawings and subsequently claimed.

In the drawings, Figure 1 represents a perspective view of a fence-post constructed according to my invention, and Fig. 2 a horizontal section on line 2 2 of the preceding figure.

Referring by letter to the drawings, A represents my improved post, the same being made from flexible sheet metal, preferably galvanized iron.

The blanks for the post are tapered, as is evident from the finished article shown by Fig. 1. Each blank is slitted at the lower end, in order that certain portions of the metal can be bent up at right angles to form lateral ears B, that correspond in number to the sides of the post and serve as supports or anchors for the finished post, and along its length said blank is stamped out at certain intervals to form clips C, the latter being preferably of triangular shape. The main portion of the blank is bent to form a triangle in horizontal section, and while I have shown only one face of the triangle provided with the clips C it is obvious that two or all of said faces may be thus provided, should such a construction be found necessary or desirable.

The strands D of the fence-wire are laid between the clips C and the adjacent face of the post and said clips bent in and down, thereby clamping said wire firmly in place.

By the construction above described I provide a very light and durable post, that can be manufactured and sold at a comparatively low price.

Another advantage of my invention lies in the fact that the blanks for the posts can be packed in lots, so as to economize space in the matter of storage and transportation, as no skilled labor is requisite to bend said blanks into shape for use as posts.

I am aware that sheet-metal fence-posts of various patterns have been made, and that the clips for securing the strands of wire to such a post are not new, and such I do not claim.

Having thus fully described my invention, what I claim as new, and desire to secure by Letters Patent, is—

A sheet-metal fence-post tapered as to length and triangular in horizontal section, the lower end of the post split upward for a certain distance at the corners, and the metal between slits bent out at right angles to the post to form lateral ears, substantially as set forth.

In testimony that I claim the foregoing I have hereunto set my hand, at Milwaukee, in the county of Milwaukee and State of Wisconsin, in the presence of two witnesses.

SHERMAN B. SALSICH.

Witnesses:
N. E. OLIPHANT,
WILLIAM KLUG.

228

(No Model.)

P. MILES.

WIRE LATH.

No. 429,935. Patented June 10, 1890.

Fig. 1.

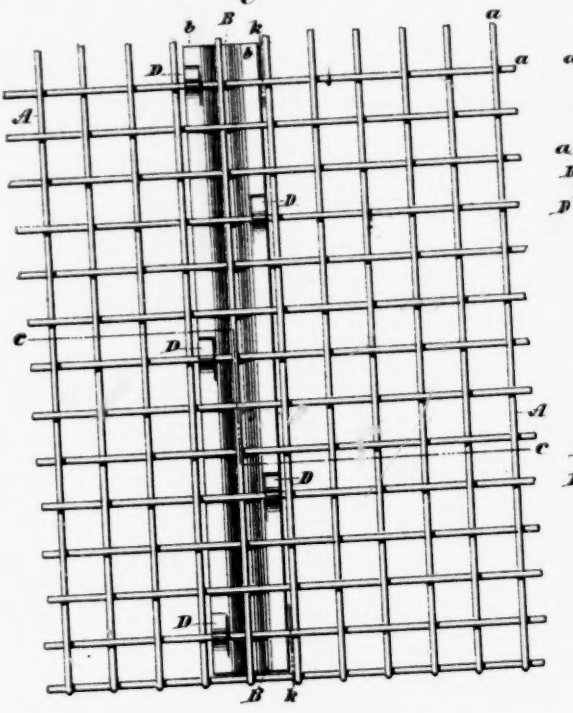


Fig. 2.

Fig. 3.

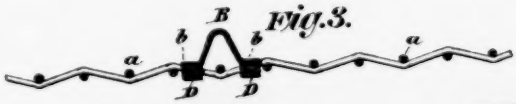


Fig. 4.

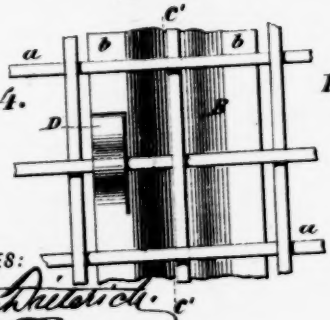
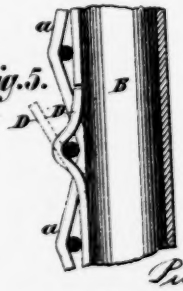


Fig. 5.



WITNESSES:

Gustave Dieterich

Ch. Aug. Dieterich

INVENTOR

Purches Miles

BY Briesen & Knauth

ATTORNEYS

UNITED STATES PATENT OFFICE.

PURCHES MILES, OF BROOKLYN, NEW YORK, ASSIGNOR TO THE CLINTON WIRE CLOTH COMPANY, OF CLINTON, MASSACHUSETTS.

WIRE LATH.

SPECIFICATION forming part of Letters Patent No. 429,935, dated June 10, 1890.

Application filed December 3, 1889. Serial No. 332,369. (No model.)

To all whom it may concern:

Be it known that I, PURCHES MILES, a resident of Brooklyn, Kings county, and State of New York, have invented certain new and useful Improvements in Wire Laths, of which the following is a specification.

Heretofore wire lath, which usually consists of wire-cloth, has been stiffened by bars or strips secured to the lath by metal clips or by weaving in. This stiffening is called "furring." It is expensive to apply the furring or stiffeners to the wire lath by means of clips, because, as far as I am aware, it has always been done by hand.

The object of my invention is to so simplify and improve the connection between the stiffening strips or furring and the wire-cloth as to materially reduce the cost of the wire lath, while improving the whole structure.

The invention consists in the combination, with the wire cloth or lath, of a stiffening strip or piece consisting of a U-shaped bar having flanges and in said flanges lips formed integral therewith and laid along the lath, said lip being folded over a wire of the cloth or lath, whereby the cloth and strip are secured together in a simple and effective manner.

The invention further consists in the novel details of improvement that are more fully hereinafter set forth, and then pointed out in the claims.

Reference is to be had to the accompanying drawings, which form part of this specification, wherein—

Figure 1 is a face view of a piece of wire lath embodying my invention; Fig. 2, a section through *k k* of Fig. 1; Fig. 3, a section along the line *c c*, Fig. 1; Fig. 4, a detail view of the U-shaped stiffener, showing the method of its fastening to the wire lath; and Fig. 5, a longitudinal section along the line *c' c'*, Fig. 4.

Similar letters throughout the several views indicate similar parts.

A represents a piece of wire-cloth composed of strands *a*, woven into substantially the shape shown in Fig. 1.

B represents a U-shaped bar having flanges *b b*, in which flanges lips D D are cut at suitable places. These lips are adapted to inclose the strands *a* of the wire-cloth, and when bent down upon the strand hold the stiffener securely in place. The U-shaped bar or stiffener is preferably struck out of sheet metal—such as iron—for the reason that such material is much cheaper and lighter. The lips D D are cut, as shown in the drawings, on both of the flanges *b b*, substantially as shown in Figs. 1 and 4. The stiffener after it has been cut upon its flanges according to my invention has lips projecting upward, as shown in dotted lines in Figs. 2 and 5, and after the stiffener has been pushed upon the wire-cloth the strands are held in these lips, and the lips are pressed down by machinery or other suitable means, and thus the stiffener and wire-cloth are firmly held together. In the drawings these lips are cut on opposite sides alternately—that is, the first lip incloses a strand on the left side of the groove in the stiffener, and the second lip holds a strand in the right side of the stiffener below the first lip. This is not necessary, for it is obvious that the lips may be placed side by side—that is, the first and second lips may inclose the same strand, my invention being an improved wire lath, consisting of wire-cloth having a stiffener which is grooved or U-shaped with flanges on opposite sides of the groove and with lips in these flanges whether placed side by side or alternating, said lips being adapted to pass through the mesh of the wire-cloth and to be folded or laid over the strands of said cloth, and thus securely attach itself to the wire-cloth.

I am aware that grooved or U-shaped stiffeners have been used in wire lathing, but they have been fastened by means of clips entirely separate from the stiffener.

In my improved lathing the lips or fasteners for the stiffener are integral with the stiffener, being cut in the flanges and struck upward.

The advantages of my improved construction of wire lathing are that the stiffener may be fastened to the wire lathing by means of machinery and held securely in place by reason of the lips engaging the strands. There is little or no hand-work required and no extra material to be wasted.

Having now described my invention, what I desire to claim and secure by Letters Patent is as follows:

1. A stiffener for wire cloth or lath, consisting of a grooved or U-shaped bar having flanges on opposite sides, and lips in said

flanges, extending substantially parallel with the length of the bar and projecting outwardly from said flanges, said lips being adapted to pass simultaneously through the mesh of a wire cloth or lath and to be folded or laid over the strands of said cloth or lath to confine said wires between the bar or flanges and the lips, substantially as described.

2. A stiffener for wire cloth or lath, consisting of a grooved or U-shaped bar having flanges on opposite sides, and lips in said flanges, said lips alternating on opposite sides of the bar and extending substantially parallel with the length of the bar, and adapted to engage the strands of the wire cloth or lath, substantially as described.

3. A stiffener for wire-cloth, consisting of a grooved or U-shaped bar having flanges on opposite sides and lips in said flanges, extending substantially parallel with the length of the bar, in combination with a wire cloth or lath against which said stiffener is placed, the lips of the stiffener being folded or laid over the strands of the cloth to confine said strands between the bar or flanges and the lips, substantially as described.

PURCHES MILES.

Witnesses:
HARRY M. TURK,
HENRY E. EVERDING.

231

(No Model.)

G. W. BOND.

FENCE POST.

No. 432,930. Patented July 22, 1890.

FIG. 1.

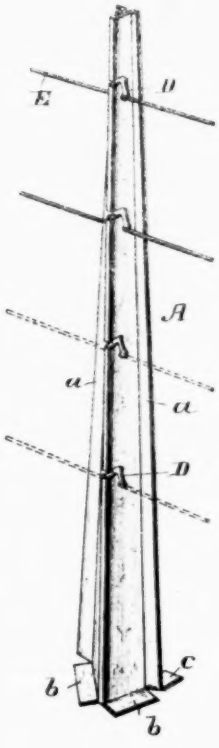


FIG. 2.

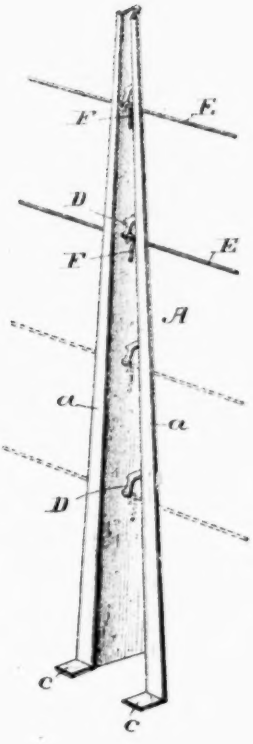
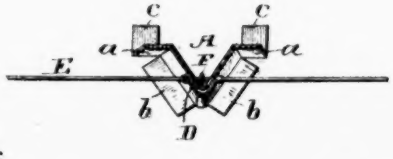


FIG. 3.



WITNESSES.

J. Henry Kaiser.

G. M. Copenhaver

INVENTOR

George W. Bond

by Franck D. Johns

his Attorney

UNITED STATES PATENT OFFICE.

GEORGE W. BOND, OF ADRIAN, MICHIGAN, ASSIGNOR TO HIMSELF, CHESTER C. VAN DOREN, AND LEVI H. ROATH, OF SAME PLACE.

FENCE-POST.

SPECIFICATION forming part of Letters Patent No. 432,930, dated July 22, 1890.

Application filed August 3, 1889. Serial No. 319,608. (No model.)

To all whom it may concern:

Be it known that I, GEORGE W. BOND, a citizen of the United States, residing at Adrian, in the county of Lenawee and State of Michigan, have invented certain new and useful Improvements in Fence-Posts; and I do hereby declare the following to be a full, clear, and exact description of the invention, such as will enable others skilled in the art to which it appertains to make and use the same.

My invention relates to improvements in fence-posts, and more particularly to that class of metal fence-posts which are used in the construction of wire fences; and it consists in certain novelty in the construction of said post and the means employed for attaching the wires to the same, all of which I will now proceed to point out and describe, reference being had to the accompanying drawings, in which—

Figure 1 is a perspective of a fence-post constructed in accordance with my said invention, showing one or more wires attached to the same. Fig. 2 is a perspective taken on the opposite side of the post from that shown in Fig. 1; and Fig. 3 is a cross-section of the same, looking down.

Referring to said drawings, A represents a fence-post constructed of suitable metal and formed V-shaped in cross-section and tapering from the bottom to the top. *a* are vertical strengthening-flanges formed on each side of the V-shaped portion of the post and extending from the top to the bottom of the same. The lower end or base of said post is split, and the lower ends of the V-shaped portion of the post are bent out substantially at right angles, forming feet or supporting-flanges *b* on one side of said post. The lower ends of the flanges *a* are also bent out, forming feet or supporting-flanges *c* on the opposite side of the post from the feet *b*. The lower portion or base of the post, when in use, is preferably sunk a sufficient distance below the surface of the ground to be free from the effects of frost, and the feet or supporting-flanges of the same prevent said post from tilting or canting to either side, and at the same time forming an anchor to prevent the post from being pulled up on undulating or uneven surfaces. In the apex of the V-shaped portion of said post are formed downwardly-extending notches D, in which the wires are adapted to be secured.

E represents the wires, which are first inserted in the notches, so as to leave a space between the same and the inside of the V-shaped portion of the post. In this space a securing pin or bolt F is inserted, which locks the same in place and effectually prevents said wires from being detached from the post when said pin is in place, the shape of the notch in which said wires are placed also aiding in holding the same on the post. Instead of using a securing-pin for each wire, a long pin or rod may be used. The wires being in place, said long rod or pin may be inserted from the top of the post, passing down from said top to the bottom of the same and between said post and wires.

I am aware of the patent of Brinkerhoff, No. 189,918, granted April 24, 1877, which shows a post provided with strengthening-flanges having their lower ends bent outward at right angles and forming lips for holding the post down, and therefore I do not herein claim, broadly, a post having strengthening-flanges provided with projecting lips or anchor-feet at their lower ends; but

What I do claim as new, and desire to secure by Letters Patent, is—

The metal fence-post A, formed V-shaped in cross-section and provided with the vertical strengthening-flanges *a*, and having its base split and the lower end of the V-shaped portion of the post bent to form supporting feet or flanges *b*, and the lower ends of the flanges *a* bent to form feet or flanges *c*, located on the opposite side of the post from the flanges or feet *b*, said feet *b* and *c* being substantially at right angles to the post and its strengthening-flanges *a*, and having the notches D, for the reception of the wires, substantially as shown and described.

In testimony whereof I affix my signature in presence of two witnesses.

GEORGE W. BOND.

Witnesses:
A. E. BARAGAR,
R. B. ROBBINS.

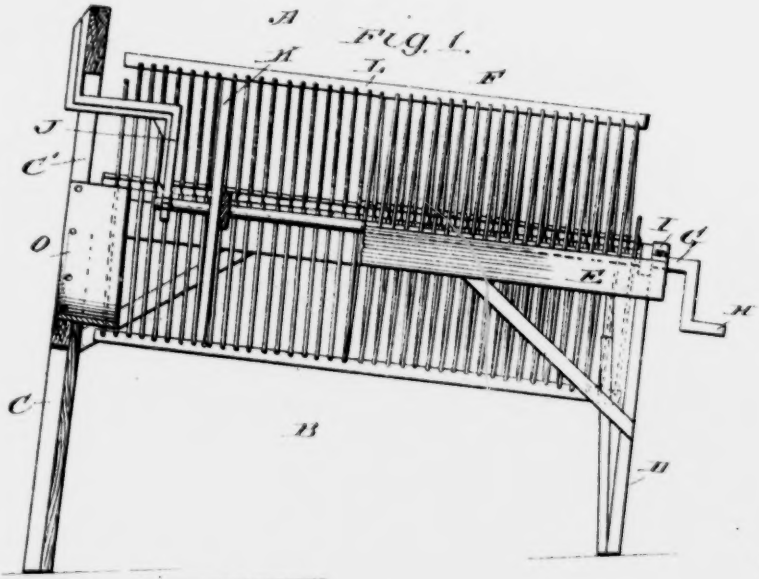
233

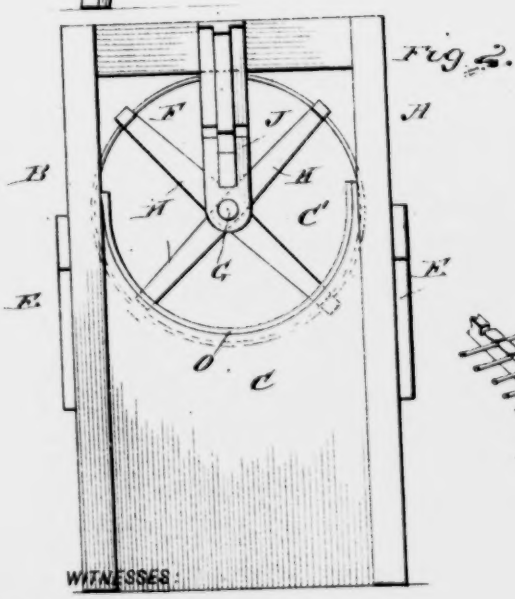
(No Model.)

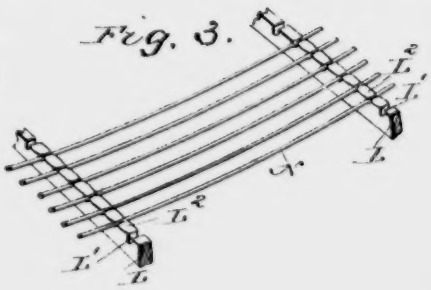
C. PRESCOTT & M. H. BENNETT.

SAND SCREEN.

No. 447,162. Patented Feb. 24, 1891.







WITNESSES:

W. R. Davis.

E. M. Clark

INVENTOR:

C. Prescott

M. H. Bennett

BY Munn & Co

ATTORNEYS

UNITED STATES PATENT OFFICE.

CHARLES PRESCOTT AND MOSES H. BENNETT, OF FAIRMOUNT, NEBRASKA.

SAND-SCREEN.

SPECIFICATION forming part of Letters Patent No. 447,162, dated February 24, 1891.

Application filed June 30, 1890. Serial No. 357,269. (No model.)

To all whom it may concern:

Be it known that we, CHARLES PRESCOTT and MOSES H. BENNETT, of Fairmount, in the county of Fillmore and State of Nebraska, have invented a new and Improved Sand-Screen, of which the following is a full, clear, and exact description.

The object of the invention is to provide a new and improved sand-screen which is simple and durable in construction, very effective in operation, and quickly separates the fine sand from the coarser materials, such as gravel, &c.

The invention consists in certain parts and details and combinations of the same, as will be described hereinafter, and then pointed out in the claim.

Reference is to be had to the accompanying drawings, forming a part of this specification, in which similar letters of reference indicate corresponding parts in all the figures.

Figure 1 is a side elevation of the improvement with parts in section. Fig. 2 is an upper end view of the improvement; and Fig. 3 is a perspective view of part of the screen, showing the fastening of the coiled wire to the longitudinal bars.

The improved sand-screen A is provided with a suitable frame B, having an inclined head C and a foot D, said head and foot being connected with each other by suitable beams E. In the frame B is arranged a screen F, having a longitudinal and slightly-inclined shaft G, carrying at its lower end a crank-arm H for conveniently turning the shaft and its screen. The shaft is mounted near its lower end in a bearing I secured on the foot D, and the upper end of the said shaft is journaled in a bracket J, secured to the head C and projecting through the opening C′ in the latter a suitable distance into the screen F, as is plainly shown in Fig. 1. The bracket J is arranged in this form so as to present no obstruction when introducing material through the opening C′ into the upper end of the screen F.

On the shaft G are secured sets of spokes K, which support at their outer ends longitudinally-extending bars L, each provided with recesses L′ formed on their inner sides and adapted to receive the coils of a wire N forming the meshes of the screen. The wire N is coiled in cylindrical form and is passed into the several recesses L′ of the longitudinal bars L, after which the part L² extending between two successive recesses L′ is hammered so as to cover the coil, thereby holding the latter in place on the longitudinal bars. The coil of wire N extends throughout the length of the bars L and the coils are placed suitable distances apart, according to the material under treatment.

In the bottom of the opening C′ is secured a semicircular plate O, which extends into the upper end of the screen F, so that the material passed over the said plate O is guided onto the upper end of the screen. As the latter is placed in an inclined position, the material readily passes from the upper end of the screen toward its lower end when the shaft G is turned, and the material is constantly agitated by the revolution of the screen, so that the fine sand falls through the meshes formed by the coils of the wire N between the head C and the foot D, while the coarser material travels along the screen to the lower end and drops out of the latter at the outside of the foot D.

It will be seen that a screen formed in this manner is very simple and durable in construction, can be cheaply manufactured, and is not liable to get out of order. The bars L are preferably of a soft metal, so as to permit easy riveting of the parts L² to lock the coils of the wire N in place.

The bars L may be placed inside the coil of wire N, and in this case the recesses L′ are formed on the outer side or top of the bars.

Having thus described our invention, we claim as new, and desire to secure by Letters Patent—

The herein-described screen, comprising the frame B, having a circular opening C′ in its front, a double angle-bracket J, secured to the front of the frame, projecting through the said opening, and having a shaft-bearing in the lower end of its inner depending arm, a bearing I at the opposite end of the frame, a rotary sieve having a central shaft G mounted in the said bearings, the bracket J, projecting into the interior of the screen, as shown, and the curved plate O, projecting inwardly from the bottom of the opening C′, substantially as set forth.

CHARLES PRESCOTT.
MOSES H. BENNETT.

Witnesses:
CLARK ROBINSEN,
J. E. CURTISS.

(No Model.)

J. NORWOOD.

SCREEN FOR SAND, &c.

No. 571,575. Patented Nov. 17, 1896.

Fig. 3.

Fig. 4.

Fig. 2.

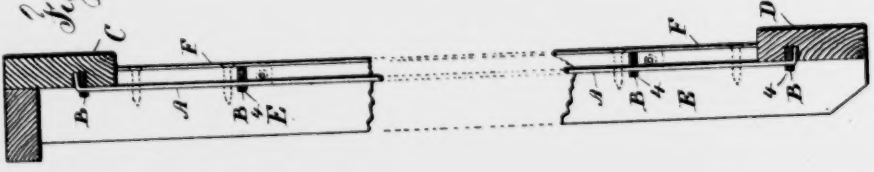
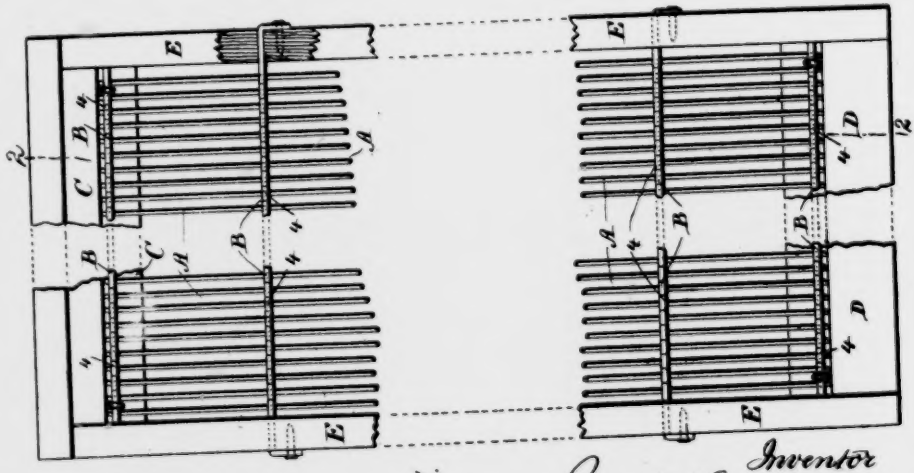


Fig. 1.



Witnesses
Chas. A. Smith
J. Stair

Inventor
Joseph Norwood
per L. W. Serrell & Son
Attys

UNITED STATES PATENT OFFICE.

JOSEPH NORWOOD, OF BROOKLYN, NEW YORK

SCREEN FOR SAND, &c.

SPECIFICATION forming part of Letters Patent No. 571,575, dated November 17, 1896.

Application filed March 11, 1896. Serial No. 582,719. (No model.)

To all whom it may concern:

Be it known that I, JOSEPH NORWOOD, a citizen of the United States, residing at Brooklyn, in the county of Kings and State of New York, have invented an Improvement in Screens for Sand, &c., of which the following is a specification.

Screens have heretofore been made with longitudinal parallel wires and the wires have been kept at the proper distances apart by cross-lacings of wire, and in some instances the lacing-wires have also secured transverse rods. This involves considerable hand labor and the expense is correspondingly increased. In other instances the parallel wires have been let into notches in the edges of bars and the metal at the ends of the notches has been upset or riveted, so as to spread the same partially over the wires and hold them in position; but this mode of securing the wires is unreliable and requires considerable labor in spreading or upsetting the metal to secure the wires.

The object of the present invention is to simplify the construction of the screen, lessen the cost of the same, and render the connection between the wires and the cross-bars stronger and more durable.

I make use of parallel wires held together by one or more cross-bars, each cross-bar being made with diagonal incisions for the reception of the wires, and which wires are held firmly in position by bending down the hook-shaped points of the cross-bars at the acute angles between the slots and the edges of the cross-bars, thus firmly grasping and holding the parallel wires; and in constructing a sand-screen I use similar cross-bars at the top and bottom ends, the same being introduced into grooves or between transverse slats at the top and bottom ends of the screen, and the ends of the cross-bars are bent up at right angles, so as to firmly hold the side pieces of the screen-frame in their proper relative positions.

In the drawings, Figure 1 is an elevation representing the top and bottom portions of a sand-screen, one of the side pieces being in section. Fig. 2 is a longitudinal section at the line 2 2. Fig. 3 shows part of one of the cross-bars with some of the wires in position and with some of the slots open ready for the reception of the longitudinal wires, and Fig. 4 is a plan of the parts shown in Fig. 3.

The parallel bars A or wires are of any desired size, shape, and length, and the cross-bars B are applied at suitable distances apart, and each cross-bar is of the desired strength and preferably of a comparatively soft steel, and in one edge of each cross-bar slots 3 are made by the action of a suitable die and punch or by saws or cutters. Each slot is diagonal, so as to leave the metal at one side of the slot in the form of an acute angle, and the slots are sufficiently deep for the acute angles to form hooks 4, and the wires are introduced into the slots and resting at the bottoms of the slots the hooks 4 are pressed down or bent over the wires, so as to retain them in position in a very firm and reliable manner, and by making the slots in the form represented in Fig. 3 the acute-angle hooks 4 can be bent down rapidly by a roller or other tool forcibly brought into contact with the edge of the bar and passed across the same.

It is advantageous to bend the ends of the wires A at right angles, so as to come outside the top and bottom cross-bars of the screen and thus prevent end motion to such wires.

Screens made in this manner can be made up into any desired form, and where they are employed with a wooden frame, as shown in the drawings, for use in screening sand, ashes, or other materials, the top and bottom cross-bars and the bent ends of the wires A are received into grooves in the top and bottom cross-pieces C and D, which connect the side pieces E at the upper and lower portions of the screen, or these top and bottom cross-bars B may be received between two of the slats or cross-pieces forming the top and bottom ends of the screen.

The intermediate cross-pieces B on the screen are made sufficiently long for their ends to project beyond the side pieces E, and such cross-pieces are received into notches or saw-cuts in the back edges of such side pieces E, and they are bent outwardly and at right angles and preferably secured by screws or nails passing through the perforated ends of the cross-bars, so as to connect the side pieces E firmly to the cross-bars, and I usually employ bands F, nailed or screwed to the back edges of the side pieces E, as an ad-

ditional support for holding the cross-bars B in their proper positions.

I claim as my invention—

1. The combination in a screen with the top and bottom cross-pieces having grooves in their surfaces, of longitudinal parallel wires having their ends bent at right angles, cross-bars each having diagonal slots forming acute-angle hooks, the slots receiving the wires and the hooks bent down to hold such wires in place, the intermediate cross-bars being secured at their ends to the side members of the frame and the cross-bars at the respective ends of the parallel wires being received with the bent ends of such wires into the grooves of the top and bottom cross-pieces of the frame, substantially as set forth.

2. The combination in a screen with the parallel wires, of cross-bars slotted diagonally and receiving the wires, the acute-angled hooks of the cross-bars being bent down to hold the wires in position and the ends of the cross-bars being bent at right angles, the cross-pieces C D and the side frames connected together, such side frames being notched for the passage of the end portions of the cross-bars, and to which side pieces the ends of the cross-bars are connected, substantially as set forth.

Signed by me this 9th day of March, 1896.

JOSEPH NORWOOD.

Witnesses:

GEO. T. PINCKNEY,

MARY L. BYRNE.

238

(No Model.)

J. B. JOHNSTON.

FENCE POST.

No. 589,898. Patented Sept. 14, 1897.

Fig. 1.

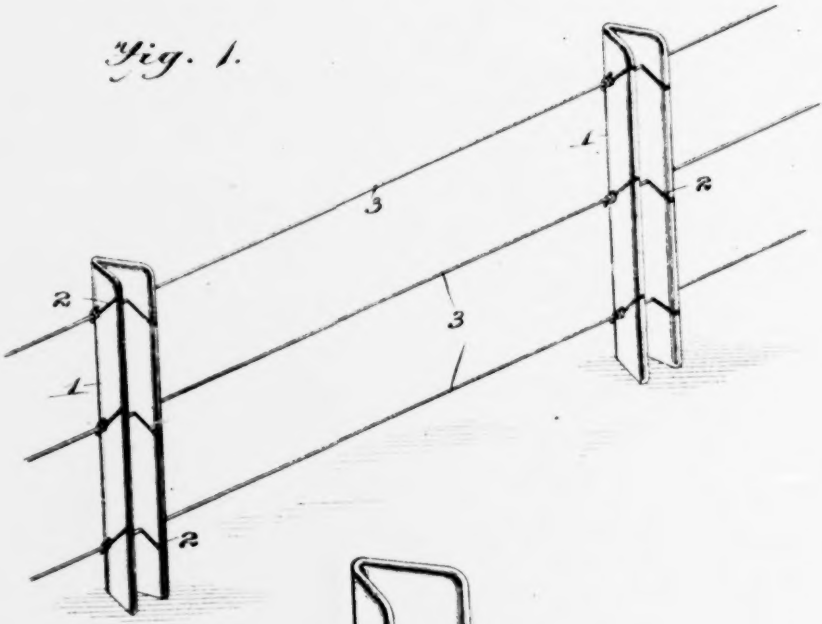
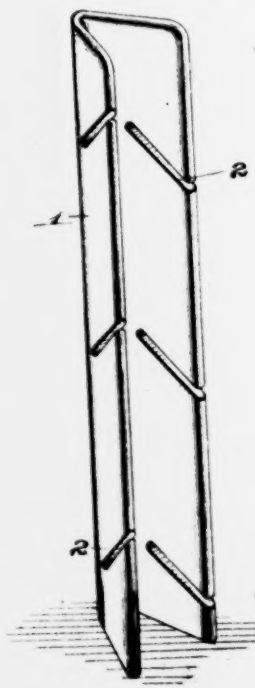


Fig. 2



WITNESSES

C. E. Hunt.

A. M. Poynton

INVENTOR

James B. Johnston,

By John Huddersburn

Attorney

UNITED STATES PATENT OFFICE.

JAMES BOWER JOHNSTON, OF PUEBLO, COLORADO, ASSIGNOR OF ONE-HALF TO H. W. GIBBONS AND CHARLES H. SCHELL, OF SAME PLACE.

FENCE-POST.

SPECIFICATION forming part of Letters Patent No. 589,898, dated September 14, 1897.

Application filed January 12, 1897. Serial No. 618,920. (No model.)

To all whom it may concern:

Be it known that I, JAMES BOWER JOHNSTON, a citizen of the United States, residing at Pueblo, in the county of Pueblo and State of Colorado, have invented certain new and useful Improvements in Fence-Posts; and I do hereby declare the following to be a full, clear, and exact description of the invention, such as will enable others skilled in the art to which it appertains to make and use the same.

In a companion application filed January 12, 1897, Serial No. 618,919, I have described an improved form of fence-post which is V-shaped in cross-section and is provided with oppositely-disposed angularly-arranged slits in the outer edges of the sides thereof, through which the line-wires are adapted to be passed, and a woven-wire clamping device for preventing the lateral displacement of the line-wires. The said fastening device has proved very effective, but in order that a more permanent means of securing the line-wires in place may be provided I have devised another form of fence-post, which forms the subject-matter of the present application.

This invention therefore consists of a fence-post constructed of any suitable form and dimensions and of concrete or other analogous material, the side edges thereof being provided with slits through which the line-wires of the fence pass, the said line-wires being securely held in place by means of cement, concrete, or other like material applied to said slits and closing them after the line-wires are in place.

The invention is clearly illustrated in the accompanying drawings, in which—

Figure 1 represents a perspective view of a fence, showing my improved fence-post and the line-wires connected thereto. Fig. 2 is a detail perspective view of one of the posts before the line-wires are applied.

Like reference-numerals indicate like parts in both views.

As above stated, the fence-post 1 may be of any suitable form and dimensions. The same is preferably constructed of concrete, fire-clay, or other analogous material, and has cut in the side edges thereof angularly-arranged slits 2 2, through which the line-wires 3 are adapted to be passed. When said line-wires have been stretched to the proper degree of tension, they are passed through the slits, and are afterward secured in place by means of cement or concrete, which is placed around said wires on the inside of said slits, closing the latter and making a homogeneous post.

While I have referred herein to the line-wires 3 as passing through the slits 2 2 in said fence-post, it is obvious that I may employ, instead of said line-wires, bands, chains, gas-pipe, or any other suitable fencing material, the method and application being the same whatever material may be used.

Having now described the invention, what I claim as new, and desire to secure by Letters Patent, is—

1. A fence-post having slits in the side edges thereof through which the line-wires are adapted to be passed, the said line-wires being held in place by the application of cement or concrete to said slits, substantially as described.

2. A fence-post having angularly-arranged slits in the outer edge thereof in which the line-wires of the fence are adapted to be inserted, the said line-wires being sealed in place and prevented from slipping by means of cement or concrete applied in a plastic condition to said slits, substantially as described.

In testimony whereof I have signed this specification in the presence of two subscribing witnesses.

JAMES BOWER JOHNSTON.

Witnesses:
JOHN S. HAMMOND,
H. W. ROBERTS.

240

No. 657,827. Patented Sept. 11, 1900.

W. McCALL.

METAL LATH ATTACHMENT AND SUPPORT.

(Application filed May 2, 1900.)

(No Model.)

Fig. 1.

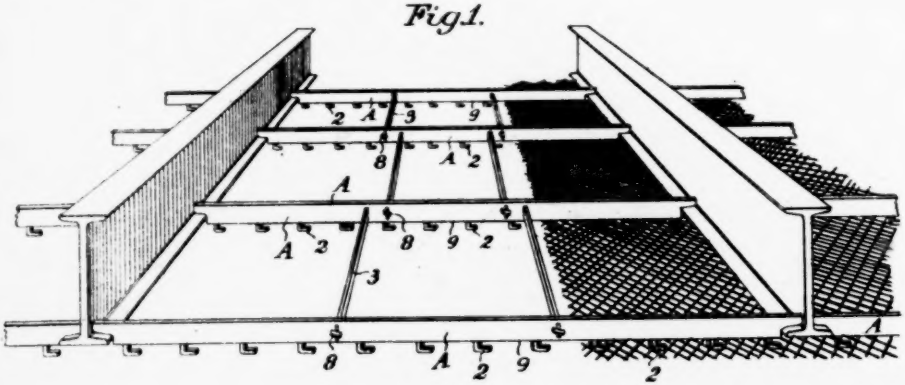


Fig. 2

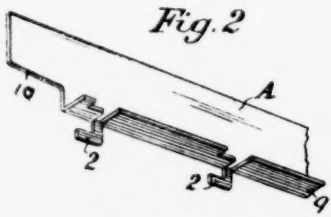


Fig. 3.

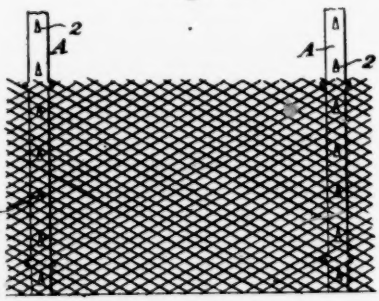


Fig. 4.

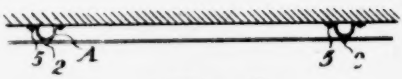


Fig. 5.

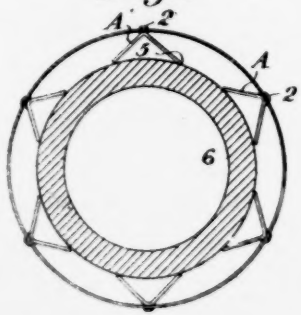


Fig. 8.

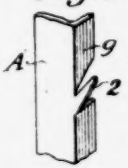


Fig. 6.

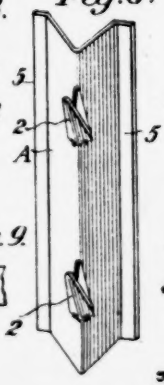


Fig. 7.

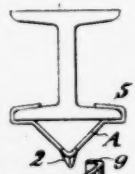
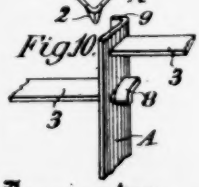


Fig. 9.

Fig. 10.



Witnesses,

E. A. Brandau

G. H. Amse

Inventor,

William McCall

By Dewey Strong & Co.

Attys

UNITED STATES PATENT OFFICE.

WILLIAM McCALL, OF SAN FRANCISCO, CALIFORNIA.

METAL-LATH ATTACHMENT AND SUPPORT.

SPECIFICATION forming part of Letters Patent No. 657,827, dated September 11, 1900.

Application filed May 2, 1900. Serial No. 15,206. (No model.)

To all whom it may concern:

Be it known that I, WILLIAM McCALL, a citizen of the United States, residing in the city and county of San Francisco, State of California, have invented an Improvement in Metal-Lath Attachments and Supports; and I hereby declare the following to be a full, clear, and exact description of the same.

My invention relates to a means for securing and supporting metal lathing, such as is employed in the construction of fireproof and other buildings.

It consists of the parts and the constructions and combination of parts hereinafter described and claimed.

Figure 1 is a perspective view showing the application of my invention as applied to a ceiling. Fig. 2 is a view of the metal-lath attachment. Fig. 3 is a view showing application to a wall. Fig. 4 is a plan. Fig. 5 shows the application to a column. Fig. 6 is a view of a modification. Fig. 7 shows application to ceiling-beam. Fig. 8 shows a modification of the hooks. Figs. 9 and 10 are detail views of the transverse strips.

The objects of my invention are to provide a means for rapidly attaching the sections of wire or expanded metal laths to the partitions, ceiling, or other portions where the lath and plastered surfaces are to be applied and to form a plurality of supports and attachments, so that the lathing is firmly held in place and is prevented from sagging or pulling away from the support when the plaster is applied or under other conditions.

I have here illustrated my invention as applied in various ways to structures where it is desirable to apply lathing.

A represents the support to which the lath is to be applied, which may be a vertical or horizontal partition or ceiling surface, or an intermediate plate attached to brick or other walls, or to columns to form a support for the lathing.

The lath-supporting structure A may be formed of parallel vertical or horizontal strips, upon the edges of which the tongues 2 are formed, and these strips are united to form a rigid structure by intermediate transverse strips or bars 3, which have tongues 8 at the ends, formed by slitting the ends transversely. These tongues pass through corresponding slots or openings in the strips A and may afterward be folded, twisted, or otherwise locked firmly to them. The edges of the strips A may be bent at right angles to form flanges 9 between the hooks, thus stiffening the strips when made of light or thin metal.

In order to support the strips A when used for ceiling purposes, the ends are cut away, as shown at 10, to correspond in shape with the lower flanges of the I-beams of the floor above, over which these ends extend toward the vertical web. The strips thus present a vertical depth sufficient to prevent sagging and are stiffened horizontally by the flanges 9 as well as by the intermediate connecting strips or bars 3. It will be understood that the same construction used as a vertical partition would have its upper and lower ends properly secured to the ceiling-beams and floor. The tongues or spurs 2 then project from the lower surface of these strips A and are in position to receive the lathing.

If the lathing is to be attached to a brick or other wall where it is desirable to have an air-space between the wall and the plastered surface, the strips A are bent into a curved or V shape or other desired form having flanges, as shown at 5, which flanges are perforated, so that nails can be driven through the holes and into the mortar-spaces between the brick or other material of which the wall is formed. The strips A are thus secured to the wall, and the outer curve or angle is then slit, as shown, so as to form the projecting tongues 2, which are bent outwardly to receive the laths.

If a column, such as is shown at 6, is to have a plastered surface, the strips A may be made either V-shaped or slightly curved and of a length sufficient to extend vertically up and down the column which is to be covered, and they may be secured in place with their open bases against the column, the angular portion presented outwardly, and the tongues 2 are cut out from these angular portions, as before described. The strips A in this case are secured to the column by wires around them at intervals or by other suitable means.

The lathing, which, as before stated, may be of wire, expanded metal, or sheets of any description having interstices through which the mortar will pass to form a bond, are then rapidly hooked upon the projecting tongues

2, which pass through the slots or interstices in the lathing, and thus support them at many points. After the lathing has thus been hung upon the points the latter are bent or closed down, so as to lock the lathing in place, by a tap of a hammer or other means, and the whole is firmly secured and supported ready to receive the plaster.

Having thus described my invention, what I claim as new, and desire to secure by Letters Patent, is—

1. The combination with parallel strips having slots, of transverse strips having their ends passed through said slots and transversely slitted to form tongues adapted to be bent to lock the transverse strip to the parallel strips.

2. A support for metallic lathing consisting of metallic plates, means for securing said plates to the wall, partition or ceiling to be covered, transverse connections having ends passed through the plates and locked thereto by twisting or bending, and tongues formed by slits made in the part to which the lath is to be attached, said tongues having the base connected with the support, and the point projecting outwardly therefrom.

3. The combination with a supporting-base of plates or strips of sheet metal having slits cut upon the sides to form tongues with one end remaining attached to the strip, said strips extending over the lower flanges of the I-beams, and having one or both edges turned at right angles with the vertical depth of the strips, and transverse connections having ends passed through the strips and locked thereto.

4. Supports for metallic lathing consisting of parallel strips of metal having slits cut to form projecting tongues upon the edges, transverse strips or bars having the ends formed to pass through corresponding slots in the adjacent parallel strips and adapted to be locked thereto by twisting or bending.

In witness whereof I have hereunto set my hand.

WILLIAM McCALL.

Witnesses:
S. H. NOURSE,
JESSIE C. BRODIE.

No. 682,316. Patented Sept. 10, 1901.

W. L. CALDWELL.

STUD FOR BUILDING CONSTRUCTION.

(Application filed Sept. 15, 1900.)

(No Model.)

Fig. 1. Fig. 2. Fig. 3.

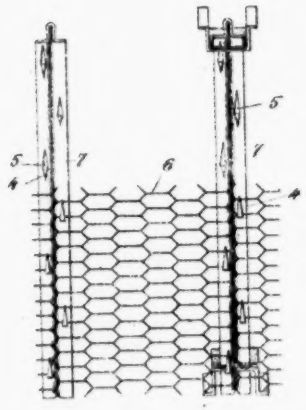
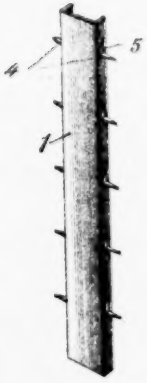


Fig. 4. Fig. 5. Fig. 6.



WITNESSES:

M. A. Scherer

H. C. Hammond.

INVENTOR

William L. Caldwell

BY

ATTORNEYS.

UNITED STATES PATENT OFFICE.

WILLIAM L. CALDWELL, OF NEW YORK, N. Y., ASSIGNOR OF TWO-THIRDS TO JOHN W. RAPP AND HENRY LOY EASTON, OF SAME PLACE.

STUD FOR BUILDING CONSTRUCTION.

SPECIFICATION forming part of Letters Patent No. 682,316, dated September 10, 1901.

Application filed September 15, 1900. Serial No. 30,120. (No model.)

To all whom it may concern:

Be it known that I, WILLIAM L. CALDWELL, a citizen of the United States, residing at New York, in the county and State of New York, have invented certain new and useful Improvements in Studs for Building Construction, of which the following is a specification.

This invention relates to improvements in studs for building construction adapted for use with perforate sheets or open-work metal lathing, particularly the expanded metal or similar lathing now in use for fireproof construction.

The invention consists in a stud or strip of rolled metal or other suitable malleable material with projections formed thereon and therefrom by punching through the metal of the stud, leaving the punched portion attached along one edge or end and with metal on both sides thereof and bending it out to form a projection, tongue, or prong capable of passing through a perforation in the metal lathing and engaging with the lathing to support same and adapted to be bent back or over the lathing, so as to hook or clench same firmly in place.

In the accompanying drawings, Figure 1 is a perspective view of a stud provided with my invention. Fig. 2 shows the studs with a portion of metal lathing in place thereon, the view being taken in front, but looking down at an angle in the structure. Fig. 3 is a vertical section of the stud and lathing from front to back. Figs. 4 to 6 show the application of the invention to various forms of stud or strip.

Referring to Fig. 1, a stud of rolled malleable metal is represented at 1, with flat face portions 2, connected by a doubled or folded central portion 2', this latter portion being preferably not bent into close contact, but kept somewhat open at the bend 3, so as not to crack the metal by too sharp bending. The flat face portion of metal stud 1 is punched or slit at a number of places, forming a plurality of prongs or tongues 4, which are allowed to adhere to the stock at one edge or end. These prongs are bent out either at the time of punching or afterward to form projections and leaving holes 5 in the stud with metal on both sides of the hole or of the prong, so that the stud is not materially weakened. The prongs may be punched up from any portion of the stud—that is, sufficiently removed from the edge and sufficiently thin—but they are preferably punched from a flat portion of the stud.

The studs having been set up in position, the metallic perforate lathing is attached thereto, as shown in Figs. 2 and 3, the said lathing (represented at 6) being placed against the studs 7 and the prongs 4 passing through the perforations in the lathing and engaging with the ribs thereof to support the same. The tongues or prongs 4 being malleable may then be upset or bent over or backward, so as to clench the lathing to the post.

Fig. 4 shows a furring-strip for side walls or ceilings, Fig. 5 an angle-stud, and Fig. 6 a box-stud, all provided with prongs 4 for engaging and supporting the metallic lathing. In the form of my invention shown in Fig. 4 the groove portion or longitudinal loop portion of the furring-strip is the part that is provided with projecting tongues or tangs 4 and the sides of the loop, which are separated, as shown, terminate in lateral flanges.

Studs may be shipped with the prongs unbent, so as to prevent injury; but by properly stacking the studs in shipment they may be safely shipped with the prongs bent out, and for convenience it is preferable to furnish them in this condition.

What I claim as new, and desire to secure by Letters Patent, is—

1. A building construction comprising perforate metallic lathing and a stud of malleable metal with flat prongs formed thereon and therefrom by making perforations in the flat portion of the metal strip so that the prongs are supported at one end and have metal on each side of them projecting through perforations in the lathing and bent over the latter so as to clench same.

2. A stud for partitions comprising a longitudinal loop portion, the edges of which are separate, lateral flanges at said edges and tangs formed from the metal comprised in the loop portion.

3. A stud for partitions comprising a longitudinal loop portion, the edges of which are separate one from the other, lateral flanges provided at said edges, and means in the said loop portion by which wire or other lath may be secured to said loop portion.

4. A stud for partitions comprising a longitudinal loop portion and means provided therein by which wire or other lath may be secured thereto.

WILLIAM L. CALDWELL

Witnesses:
A. P. KNIGHT,
J. GREEN.

Correction in Letters Patent No. 682,316.

It is hereby certified that in Letters Patent No. 682,316, granted September 10, 1901, upon the application of William L. Caldwell, of New York, N. Y., for an improvement in "Studs for Building Construction," an error appears in the printed specification requiring correction as follows: Page 1, line 93, claim 1, before the word "projecting" insert a comma; and that the said Letters Patent should be read with this correction therein that the same may conform to the record of the case in the Patent Office.

Signed and sealed this 25th day of January, A. D., 1916.

[SEAL.]

R. F. WHITEHEAD,

Acting Commissioner of Patents.

Cl. 189–9

No. 723,657. PATENTED MAR. 24, 1903.

S. L. EASON.

FENCE POST.

APPLICATION FILED SEPT. 12, 1902.

NO MODEL.

Fig. 1.

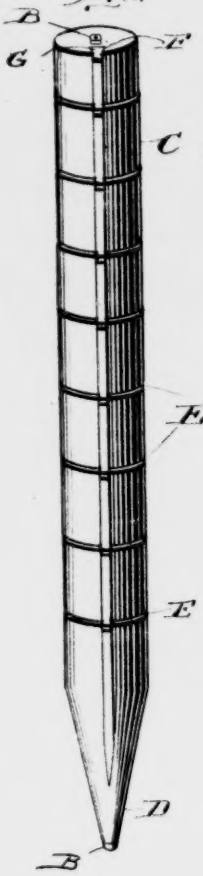


Fig. 2.

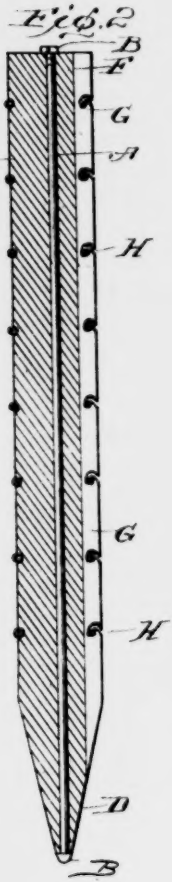


Fig. 4.

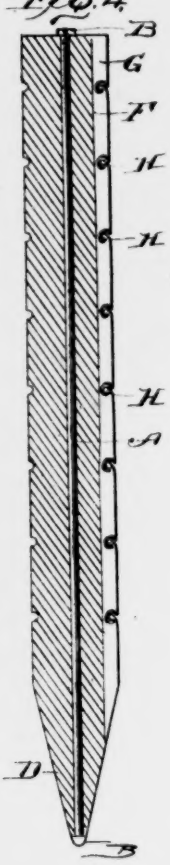


Fig. 3.

Inventor
Samuel L. Eason

Witnesses
J. M. Fowler Jr.
Mary E. Moore

Wm. N. Moore
Attorney

UNITED STATES PATENT OFFICE.

SAMUEL L. EASON, OF SCRANTON, IOWA, ASSIGNOR OF ONE-HALF TO SILAS G. KIONS, OF SCRANTON, IOWA.

FENCE-POST.

SPECIFICATION forming part of Letters Patent No. 723,657, dated March 24, 1903.

Application filed September 12, 1902. Serial No. 123,083. (No model.)

To all whom it may concern:

Be it known that I, SAMUEL L. EASON, a citizen of the United States, residing at Scranton, in the county of Greene and State of Iowa, have invented certain new and useful Improvements in Fence-Posts, of which the following is a specification.

My invention relates to improvements in fence-posts; and the object of my invention is the production of a fence-post which will be indestructible, attractive in appearance, thoroughly efficient, and inexpensive of production, thus insuring a practical fence-post.

With this object in view my invention consists of a fence-post embodying novel features of construction and combination of parts, substantially as disclosed herein.

Figure 1 represents a perspective view of my fence-post. Fig. 2 represents a vertical sectional view with the wires shown in the strip and post. Fig. 3 represents a horizontal sectional view, and Fig. 4 represents a vertical sectional view.

A designates a vertical rod which forms the core or center of my fence-post, said bar having threaded ends to receive nuts B, which serve to sustain the body C of the fence-post, said body being of cylindrical shape with the lower tapering end D to facilitate insertion or driving of the post into the ground. The body of the post is preferably made of cement and is formed with a series of grooves or depressions E, the purpose of which is to receive wires for binding the horizontal line-wires of the fence, and the body is formed on one side with an angular vertical channel F, which receives the strip G, which may be made of wood and to which the horizontal line-wires are secured by means of staples, as will be apparent, or the vertical strip may be made of metal and formed with a series of kerfs or seats H, which receive and hold the line-wires in place.

From the foregoing description and drawings it is evident that I provide a fence-post which is inexpensive of production and very durable and which is thoroughly efficient and practical.

I claim—

The fence-post herein shown and described, consisting of the central rod or core having a nut on its upper end and a tapering head on its lower end to enable the post to be easily driven, a plastic body surrounding the rod and having a vertical channel in one side, a series of parallel transverse grooves around the body and a tapering lower end and a strip fitting in the channel of the body having kerfs to receive the line-wires.

In testimony whereof I affix my signature in presence of two witnesses.

SAMUEL L. EASON.

Witnesses:
ALLEN GLENN,
P. P. PITCHER.

248

No. 736,602. PATENTED AUG. 18, 1903.

J. KAHN.

CONCRETE AND METAL CONSTRUCTION.

APPLICATION FILED DEC. 11, 1902.

NO MODEL. 4 SHEETS—SHEET 1.

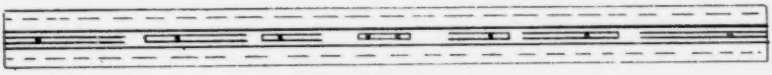


Fig 1

Fig 2

Fig 3

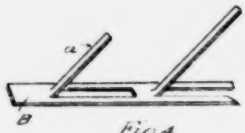


Fig 4

Fig 5

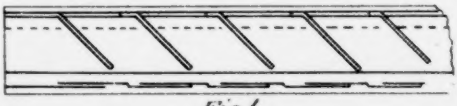


Fig 6

Fig 8

Fig 7

Fig 9

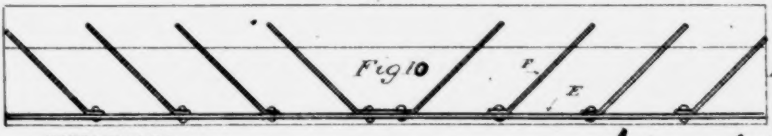


Fig 10

Fig 11

WITNESSES.

W. G. Robertson

M. B. Dagherty

INVENTOR.

Julius Kahn

By Thos. E. Sprague & Son

Attorneys.

No. 736,602. PATENTED AUG. 18, 1903.

J. KAHN.

CONCRETE AND METAL CONSTRUCTION.

APPLICATION FILED DEC. 11, 1902.

NO MODEL. 4 SHEETS—SHEET 2.

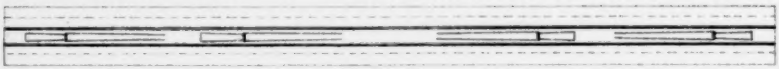


Fig. 12

Fig. 13

Fig. 14

Fig. 15

Fig. 16

Fig. 17

Fig. 18

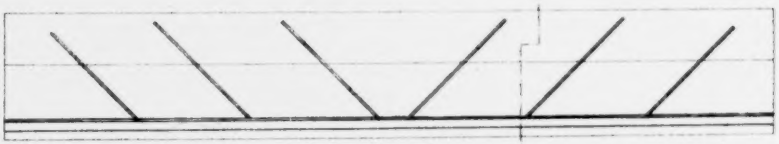


Fig. 19

Fig. 20

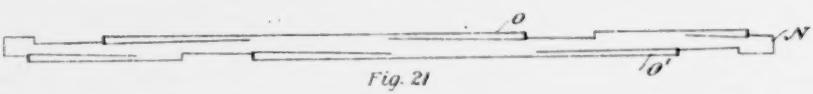


Fig. 21

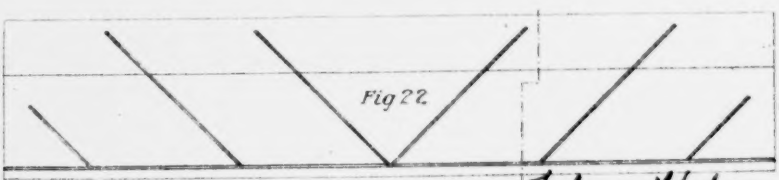


Fig 22

Fig. 23

Witnesses:
A. S. Robertson.
M. B. Dougherty

Julius Kahn
Inventor:
By Chas. E. Sprague & Co.
Attys

[redacted] 250

No. 736,602. PATENTED AUG. 18, 1903.

J. KAHN.

CONCRETE AND METAL CONSTRUCTION.

APPLICATION FILED DEC. 11, 1902.

NO MODEL. 4 SHEETS—SHEET 3.

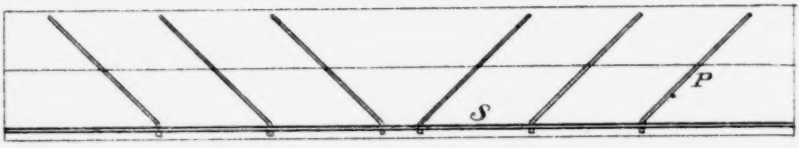


Fig. 24

Fig. 25

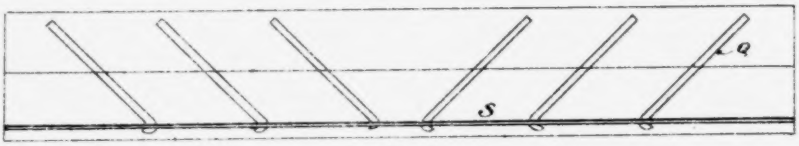


Fig. 26

Fig. 27

Fig. 28

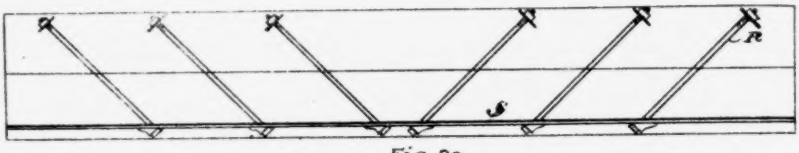


Fig. 29

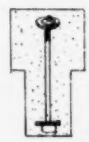


Fig. 30

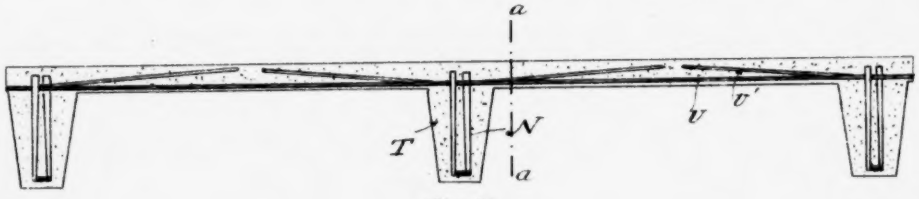


Fig. 31

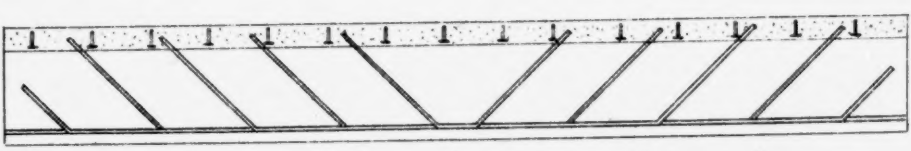


Fig. 32 Section a-a

Witnesses:
A. G. Robertson.
G. W. Latour

Julius Kahn
Inventor:
Thos. E. Smagnuson.
By Attys.

251

No. 736,602. PATENTED AUG. 18, 1903

J. KAHN.

CONCRETE AND METAL CONSTRUCTION.

APPLICATION FILED DEC. 11, 1902.

NO MODEL. 4 SHEETS—SHEET 4.

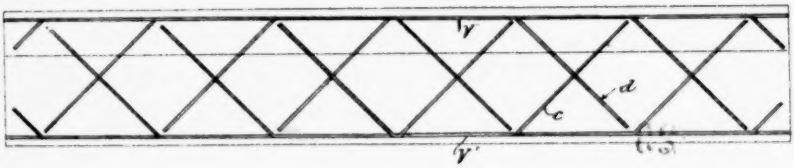


Fig. 33

Fig. 34

Fig. 35

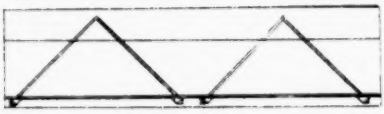


Fig. 36

Fig. 37

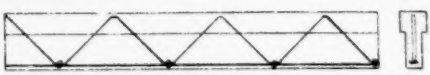


Fig. 38

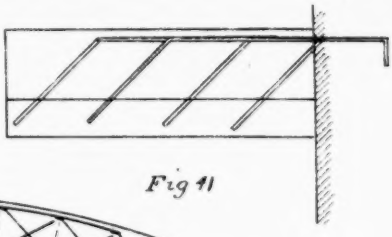


Fig. 41

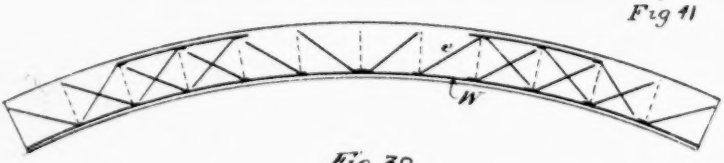


Fig. 39

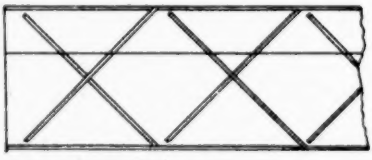


Fig. 42

Fig. 43

Fig. 40

Witnesses:
A. G. Robertson
W. B. Dougherty

Julius Kahn
Inventor
By [illegible]
Attys

UNITED STATES PATENT OFFICE.

JULIUS KAHN, OF DETROIT, MICHIGAN.

CONCRETE AND METAL CONSTRUCTION.

SPECIFICATION forming part of Letters Patent No. 736,602, dated August 18, 1903.

Application filed December 11, 1902. Serial No. 134,804. (No model.)

To all whom it may concern:

Be it known that I, JULIUS KAHN, a citizen of the United States, residing at Detroit, in the county of Wayne and State of Michigan, have invented certain new and useful Improvements in Composite Concrete and Metal Constructions, of which the following is a specification, reference being had therein to the accompanying drawings.

My invention relates to composite concrete and metal constructions, and has for the primary object the obtaining of a trussed construction in which a portion of the trussed members are formed by metal and the remaining portion by concrete or cement.

It is a further object to so construct and arrange the metallic members within the body of cement that a plurality of minor members are rigidly secured at one end to a main member, whereby the stresses developed within the former are directly carried into the latter.

The invention consists in the peculiar construction of metallic members and their arrangement in relation to the body of the cement, and, further, in the construction in which the minor and main metallic members are formed from an integral blank or structural shape, and, further, in a peculiar construction and arrangement and combination of parts, as more fully hereinafter described in claims.

In the drawings I have illustrated diagrammatically various modifications of my invention, the metallic members being shown in elevation and the outline of the body being also indicated in full lines.

Figures 1, 2, and 3 are respectively a plan, side elevation, and cross-section of the beam employing my invention. Fig. 4 is a perspective view of a metallic strengthening member employed. Fig. 5 shows the inclined bars sloping opposite from those in Fig. 2. Figs. 6, 7, 10, 13, 15, 17, 19, 22, 24, 26, 29, 33, 35, 36, and 38 are elevations similar to Fig. 2, illustrating various modifications. Figs. 9, 11, 14, 16, 18, 20, 23, 25, 27, 30, 34, and 37 are cross-sections similar to Fig. 3 respectively through adjacent elevations. Figs. 8 and 28 are perspective views of modified constructions of metallic members. Fig. 12 is a plan view of the adjacent elevation 13, and Fig. 21 is a plan of the struck-up bar in Fig. 22. Figs. 31 and 32 illustrate a floor construction embodying my invention; Figs. 39 and 40, arches. Fig. 41 is an elevation showing an overhanging ledge. Fig. 42 is an elevation showing a construction in which the longitudinal members are not embedded in the cement body, but lie adjacent thereto; and Fig. 43 is a cross-section thereof.

A common feature of all the various modifications above referred to is that a main metallic member is connected to a plurality of supplemental metallic members and the latter being attached to one end to the main member and extending obliquely therefrom into the cementitious body. Furthermore, in all of the arrangements shown the main members correspond to the chords of a truss and the minor members to the web. The intention of the invention is to so place the metal within the concrete that each is stressed in the manner most advantageous to its special nature.

In Figs. 1 to 4 the metal is arranged to correspond to the tension members in the ordinary Pratt truss. A designates the body, of concrete or other cementitious rectangular form and is adapted for use as a beam. B is the metallic strengthening member, which is formed of a flat bar of metal having a plurality of portions *a* thereof struck up centrally from the bar into an inclined position. As shown in Fig. 4, these inclined portions *a* are preferably of varying size, the end members a' being of the greatest length and the middle members a^2 being the shortest. The main member B is arranged adjacent to the lower edge of the body, but slightly embedded therein, and the minor members *a* incline upward oppositely upon opposite sides of the center of the beam. The effect of this arrangement in the completed beam is that the tensile stresses developed in the minor members *a* are communicated to the main member B directly, while the compression stresses intermediate said members *a* are resisted by the concrete through the lines shown dotted. Where main metallic members are entirely distinct from each other, (see Fig. 33,) they are in the same manner held together through the concrete which grips the projecting web

members. In Fig. 33 is shown how a metallic truss is thus completed, the concrete performing the same function as the web in a plate or latticed girder. With this arrangement it is not even necessary that the main members lie within the concrete at all, as their strain depends largely on the pull brought into them by the inclined members.

In Fig. 5 the main bar B is substantially the same as in Fig. 2, with the exception that web-bars incline in the opposite direction.

In Figs. 6, 7, 8, and 9 is shown a construction which may be used as a column in which the metallic strengthening members are arranged adjacent to each of the sides of the body. Each of these metallic members is formed from a flat bar having portions *b* struck up therefrom, but from the side of the bar instead of the center-portion thereof.

In Figs. 10 and 11 metallic members are employed in which the main member E has riveted thereto the inclined auxiliary members F.

Figs. 12, 13, and 14 illustrate a construction in which an I-beam G has portion H of the web thereof struck up to form the inclined auxiliary members.

In Figs. 15, 16, 17, 18, 19, and 20 are respectively arranged the channel-beam J, a pair of angle-beams K, and a T-beam L, each of which have portions M struck up from the webs thereof to form the inclined auxiliary members.

In Fig. 21 there is shown a strengthening member formed from a flat bar N with the auxiliary members O and O′ alternately struck up from the opposite sides of the bar.

In Figs. 24, 25, 26, 27, 28, 29, and 30 the auxiliary members P, Q, and R have a hooked or headed engagement with the main members S.

Figs. 31 and 32 show a monolithic floor and beam construction in which the beams or girders T are strenghtened by the metallic members N, while the floor slabs are strengthened by cord members U and inclined auxiliary members U′, attached thereto at opposite ends and inclined upwardly.

In Figs. 33 and 34 two main metallic members V and V′ are arranged, respectively, adjacent to the lower and upper edges of the body. These members have auxiliary members *c* and *d* struck up therefrom but oppositely inclined, so as to form, in effect, a lattice-web within the body.

Although only several arrangements of webbed bars are shown here, it is understood that I may wish to use other methods of cutting the web-bars and bolting or riveting the same to the main members, holding, however, to the essential part of the claims, that the web members be secured to the main members, thereby forming the part truss, which is completed in its functions by the property of the concrete.

Figs. 35 to 38 show improved constructions in which the auxiliary members are secured at their opposite ends to the main member.

In Figs. 39 and 40 the main member W is arched to form a compression member, and the auxiliary members *e* extend from said inner member in the cementitious body at various angles.

From the description and illustration given it will be understood that the underlying idea in my invention consists, essentially, in providing a main metallic strengthening member with a plurality of auxiliary members, said auxiliary members being rigidly attached to the main member, so as to transmit the stresses developed therein cumulatively into said main member.

What I claim as my invention is—

1. The combination with a cementitious body of a metallic strengthening member therefor, extending longitudinally thereof, and a plurality of uprightly-extending members, rigidly attached to said longitudinal metallic member, at points intermediate the ends of the latter and projecting obliquely therefrom to form the diagonal members only of a part of a truss, said laterally-extending members being embedded in said cementitious body whereby the stresses are communicated from said latter longitudinally into said main member.

2. The combination with a cementitious body of a metallic member comprising a longitudinally-extending bar and a plurality of laterally-inclined arms, struck up from said metallic member and forming a portion of a truss of which the remaining constituents are formed by the cementitious body.

3. The combination with a cementitious body of metallic members extending longitudinally and on opposite sides of said body; said main metallic members being provided with inclined laterally-extending arms or auxiliary members rigidly secured thereto intermediate their ends and adapted when set in a cementitious body to form substantially a latticed column, main members being united only through the adhesion of the cement.

4. A combination with a cementitious body of a plurality of metallic members arranged to extend longitudinally adjacent to opposite sides of the body, each member being provided with obliquely-extending arms or auxiliary members corresponding to the diagonal members only of a truss, and rigidly secured thereto intermediate its ends, the auxiliary members on the two main members being oppositely inclined to cross each other and depending upon the adhesion of the cementitious body to unite them and to form substantially a latticed girder.

5. The combination with a cementitious body of a plurality of metallic members arranged to extend longitudinally adjacent to opposite sides of said body, each member being provided with obliquely-extending arms or auxiliary members struck up from the same and intermediate its ends, the auxiliary members and the two main members being oppositely inclined to cross each other, and

depending on the adhesion of the cementitious body to both to unite them, and to form substantially a latticed girder.

6. The combination with a cementitious body of a metallic strengthening member therefor, comprising a longitudinally-extending main portion and an obliquely-inclined auxiliary portion struck up from said main portion intermediate its ends, and extending into the cementitious body for the purpose of transmitting stresses thereto.

7. The combination with a cementitious body of a metallic strengthening-body therefor, comprising a longitudinally-extending member of structural shape having intermediate portions thereof struck up to form a portion of a truss of which the remaining constituents are formed by the cementitious body.

In testimony whereof I affix my signature in presence of two witnesses.

JULIUS KAHN.

Witnesses:
M. B. O'DOGHERTY,
A. G. ROBERTSON.

255

No. 752,523. PATENTED FEB. 16, 1904.

A. G. CONSIDERE.

ARMED OR STIFFENED CONCRETE CONSTRUCTION.

APPLICATION FILED JUNE 27, 1902.

NO MODEL.

Fig. 1.

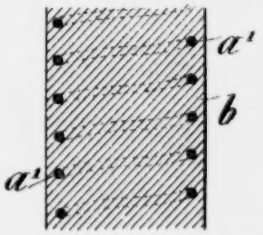


Fig. 3.

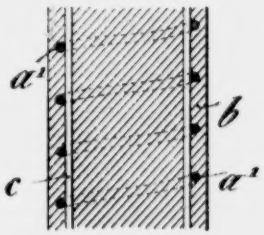


Fig. 2.

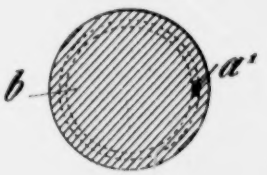


Fig. 4.

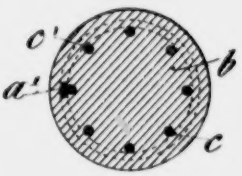


Fig. 5.

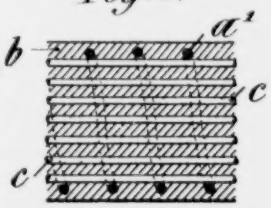


Fig. 6.

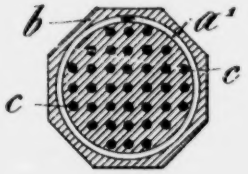
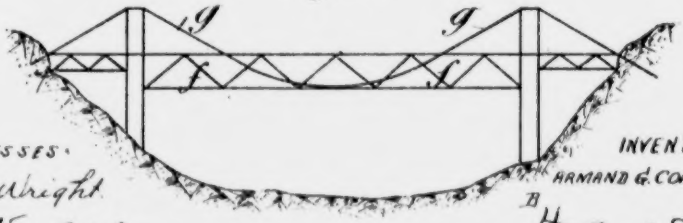


Fig. 7.



WITNESSES:
P. W. Wright
Walter Abbe

INVENTOR
ARMAND G. CONSIDERE
By
Howson and Howson
HIS ATTORNEYS.

No. 752,523. Patented February 16, 1904.

UNITED STATES PATENT OFFICE.

ARMAND GABRIEL CONSIDERE, OF PARIS, FRANCE.

ARMED OR STIFFENED CONCRETE CONSTRUCTION.

SPECIFICATION forming part of Letters Patent No. 752,523, dated February 16, 1904.

Application filed June 27, 1902. Serial No. 113,467. (No model.)

To all whom it may concern:

Be it known that I, ARMAND GABRIEL CONSIDERE, a citizen of the Republic of France, residing in Paris, France, have invented certain new and useful Improvements in Armed or Stiffened Concrete Constructions, of which the following is a specification.

This invention has for its object to produce concrete or cement columns or the like structures which in service are adapted to withstand great compression or tension strains in a longitudinal direction. This object is secured by embedding strengthening-wires in helicoidal coils around a solid concrete core and covering the coils to protect them from the atmosphere.

In the accompanying drawings, Figure 1 is a longitudinal section of part of a column constructed to sustain longitudinal pressure. Fig. 2 is a cross-section of the same. Fig. 3 is a view similar to Fig. 1 of a modification with longitudinal strengthening-rods. Fig. 4 is a cross-section of the same. Fig. 5 is a longitudinal section, and Fig. 6 is a cross-section of a column with a greater number of longitudinal rods and which is to sustain longitudinal tension. Fig. 7 is a side view showing a means for tensioning the longitudinal rods before applying the concrete.

As shown in Figs. 1, 3, and 5, a helicoidal coil of metal *a'* is embedded in a solid core *b* of concrete or cement, so as to embrace the greater part of the solid core, but sufficiently below the surface to be protected from the atmosphere by the outer covering.

In Figs. 3, 4, 5, and 6 besides the helicoidal coils the core is provided with a number of longitudinal metal rods *c*. The object of thus encircling the solid core with the helicoidal coils *a'* of metal is to overcome the tendency of the concrete column when placed under compression strain longitudinally from breaking by lateral expansion of the column later. These helicoidal coils thus greatly increase the strength of a concrete column. It also has been found that when such column has been collapsed by excessive pressure under test warning is given for quite a time before rupture.

Tensional strains in my improved columns or cables are met by providing within the coils *a'* many longitudinal rods *c*, as shown particularly in Figs. 5 and 6.

In Fig. 7 I have represented a practical construction for carrying into effect a method of giving a preliminary tension to the longitudinal wires *c*. They are suspended like an ordinary cable, and I hang a foot-bridge or other temporary structure on them to cause them to take up the curve or other shape that the resulting bridge may require, and I then apply the helicoidal coils and concrete to these cables. By this means rupture of the concrete when the finished tension members are put under tension in use will be avoided.

I am aware that it has previously been proposed to embed in concrete pipes rings of metal; but these structures are hollow and for that reason are not adapted to stand compression or tension strains in a longitudinal direction to which my solid columns or cables are to be subjected.

I am aware of British Patents No. 1,715 of 1874 and No. 14,559 of 1885, showing skeletons of iron made with spiral coils riveted to each other or to longitudinal rods to carry concrete; but in my beams the concrete forms the essential basis of the column and my coils are independent—that is, not connected to the other coils or to longitudinal rods in the concrete.

I claim as my invention—

1. A column or the like of concrete, comprising a solid concrete core with independent helicoidal coils of metal surrounding said core, and arranged very close together, substantially as described.

2. A column or the like of concrete, comprising a solid concrete core with independent helicoidal coils of metal surrounding said core, and arranged very close together, and a covering for the coils, substantially as described.

3. A column or the like of concrete, comprising a solid concrete core, longitudinal rods within the core and independent helicoidal coils of metal arranged very close together and surrounding the core and rods, substantially as described.

4. A column or the like of concrete, comprising a solid concrete core, longitudinal rods

within the core and independent helicoidal coils of metal arranged very close together and surrounding the core and rods, and a covering for the coils, substantially as described.

5. A concrete construction, comprising longitudinal metal rods tensioned in the shape they are to maintain, and a concrete covering for said rods to make a solid core, and independent helicoidal coils arranged very close together, surrounded and retaining the core, substantially as described.

In testimony whereof I have signed my name to this specification in the presence of two subscribing witnesses.

ARMAND GABRIEL CONSIDERE.

Witnesses:

LÉON FRANCKEN,

EDWARD P. MACLEAN.

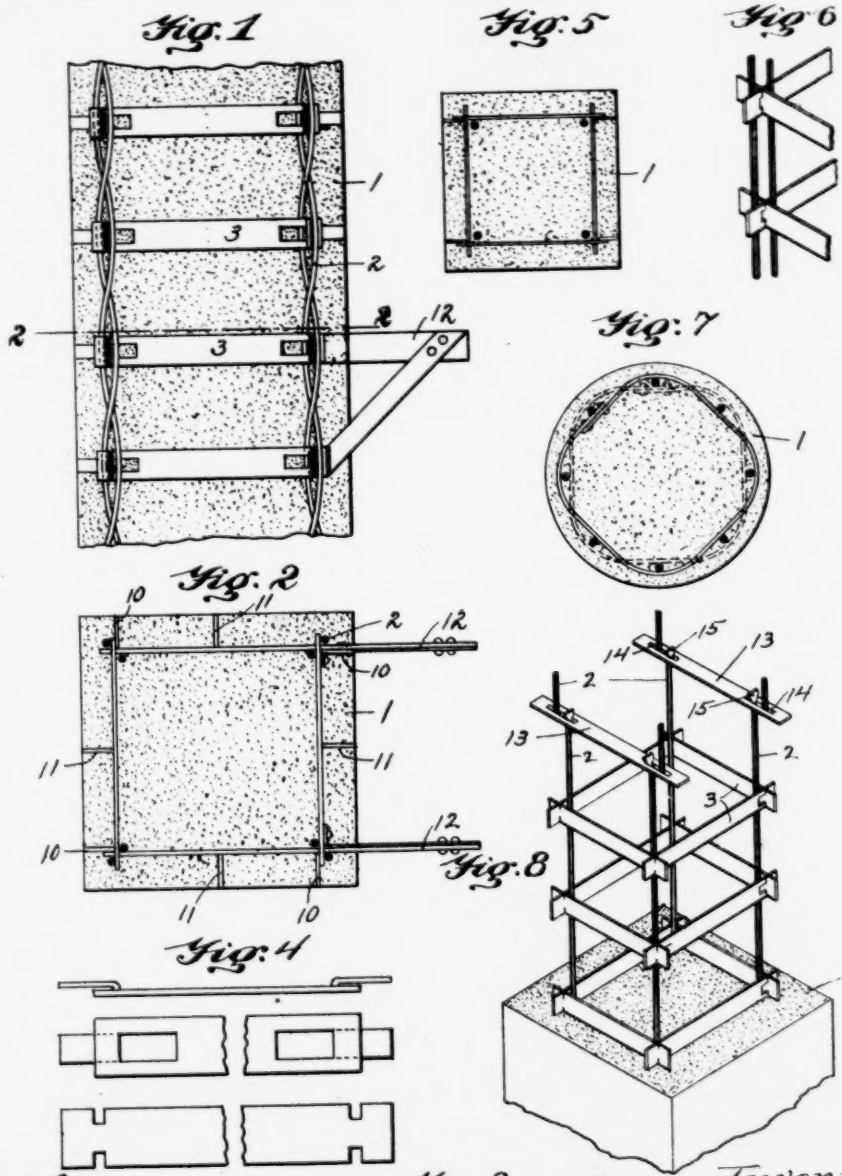
No. 764,883. PATENTED JULY 12, 1904.

R. A. CUMMINGS.

METAL AND CONCRETE COLUMN.

APPLICATION FILED MAR. 4, 1903.

NO MODEL.



Witnesses.
F D Sweet
Robert C Totten

Inventor.
Robert A Cummings
By Kay & Totten
Attorneys.

No. 764,883. Patented July 12, 1904.

UNITED STATES PATENT OFFICE.

ROBERT A. CUMMINGS, OF BEAVER, PENNSYLVANIA.

METAL-AND-CONCRETE COLUMN.

SPECIFICATION forming part of Letters Patent No. 764,883, dated July 12, 1904.

Application filed March 4, 1903. Serial No. 146,161. (No model.)

To all whom it may concern:

Be it known that I, ROBERT A. CUMMINGS, a resident of Beaver, in the county of Beaver and State of Pennsylvania, have invented a new and useful Improvement in Metal-and-Concrete Columns; and I do hereby declare the following to be a full, clear, and exact description thereof.

My invention relates to concrete columns, piles, struts, and the like used in building structures, such as bridges, viaducts, docks, fireproof buildings, and other structures.

The object of my invention is to provide a column, pile, or strut for this purpose which is composed mainly of concrete and which will carry a much greater load than those heretofore constructed.

Concrete and cement, as is well known, possess great compressive strength when properly constructed and supported, and they also are not affected by fire, water, or other elements, and for these reasons are highly desirable in many building constructions. Attempt has heretofore been made to utilize the same for columns, piles, or struts, and with some degree of success. It has been found, however, that when subjected to very heavy loads such columns fracture upon conical lines, the apices of the cones being substantially at the center of the column. This fracture is, I believe, due to the slight tensile strength of the concrete, so that it is forced apart laterally by excessive stresses applied vertically thereto.

The object of my invention is to overcome this difficulty and to provide columns and the like made largely of concrete and wherein the liability to lateral spreading or fracture is entirely or largely overcome, thus enabling the column to carry a much heavier load than would otherwise be the case.

To this end my invention consists, generally stated, in embedding in the concrete column a series of metallic straps, bands, or strips, which encircle a considerable portion of the body of the concrete, and thus prevent it from spreading or fracturing laterally. Preferably these bands or strips will be used in connection with vertical tie-rods such as have heretofore been embedded in concrete columns, and the bands will also preferably be formed of strips united at their corners by slotted connections, which will permit of their ready assembling when building up the column. My invention also comprises certain details of construction hereinafter described and claimed.

In the accompanying drawings, Figure 1 is a vertical section through the preferred form of my column. Fig. 2 is a horizontal section therethrough. Fig. 3 shows the details of construction of the bands or strips. Fig. 4 shows a modification of such bands. Fig. 5 is a horizontal section of a modified form of column. Fig. 6 is a view of the metal parts of still another modification. Fig. 7 is a horizontal section showing the idea applied to a round column, and Fig. 8 illustrates the manner of building columns in sections.

The essential idea underlying my invention consists in providing suitable means, preferably metallic, and embedded in the concrete column, pile, or the like and which encompasses or encircles all or a greater portion of the body of the concrete and prevents the same from spreading or fracturing laterally. This idea may be embodied in a large variety of specific constructions, and in the drawings I have shown the same adapted to a column having therein vertical rods, such as are now placed in concrete columns.

In the drawings the concrete is shown at 1 and the vertical rods at 2. The latter may be of various numbers and differently located, depending upon the size and shape of the column. In my preferred construction, however, I arrange these rods in pairs, as shown in Figs. 1 and 2, and with a square column, such as shown, a pair of rods will be located in each corner of the column, inside the outer face thereof, so that said rods will be entirely embedded or enveloped by the concrete, and thus protected from the elements.

At suitable intervals in the column are embedded strips or bands 3 of metal of suitable thickness and width and which act to prevent the concrete from spreading laterally. These strips or bands may be unattached to the rods 2 or may be united thereto in any suitable way. I prefer to unite the strips themselves

one to the other, so as to form practically a continuous band enveloping or surrounding the major portion of the body of the concrete. This can be conveniently accomplished by providing said strips at their meeting ends with suitable interlocking means—such, for instance, as providing one of the meeting ends with a slot 4 and providing the other meeting end with a head or enlargement 5, which latter is oblong or flat, as shown, and which can be passed through the slot 4, and then by giving the member on which it is formed a quarter-turn it will be locked in said slot, as will be readily understood. Any other convenient means, however, for uniting the ends of the strips may be employed—such, for instance, as rivets or any of the numerous interlocking means now well known in bale-ties and the like. In any event, however, the united strips will form practically a continuous band, and, if desired, a single band might accomplish the same purpose, said band having its ends suitably secured together. In the construction of round columns, such as shown in Fig. 7, the latter construction may be and preferably will be followed; but with rectangular or other polygonal shapes of columns I prefer to form the bands by uniting together a series of strips, one of which forms a side of the polygon. These strips or bands will be located in fairly close proximity one above the other and will be of such width that a substantial portion of the height of the column is surrounded by these bands. When the rods 2 are used, the bands may be secured to said rods in a variety of ways, and in the preferred form of my construction, wherein the rods 2 are arranged in pairs, the bands can be secured to the rods conveniently in the manner illustrated in Fig. 1—that is, by causing the rods to pass alternately inside and outside of the bands, as indicated—thus securing the bands in loops formed by the two rods. In this manner both rods will be held against lateral deflection by the bands, and it is possible to space the bands any desired distance apart by merely driving them down closer one with reference to the other. This arrangement also permits the position of the bands to be adjusted vertically when putting them in place.

With a column such as shown in Fig. 5, wherein a single rod only is used at each corner of the column, the bands 3 preferably will be placed outside of the rods, as shown, so as to hold the latter against outward deflection. If preferred, two rods may be used in each corner, one inside and the other outside of the bands, as shown in Fig. 6. In this case, however, the rods are not passed alternately inside and outside of the bands, as in Fig. 1. With round columns, as shown in Fig. 7, the bands preferably will be interwoven with the rods alternately inside and outside the same; but this is not necessary, as they may pass outside of all of the rods.

In building up columns according to my invention the rods 2 may or may not be employed. When such rods are used, they will be placed in vertical position and the bands 3 will be assembled therewith in any of the ways above described. A suitable mold, of wood or the like, is then built around the column, and the concrete is filled in and packed tight. The bands or strips 3 can be built up as the work proceeds, so that, in effect, the column will be built section by section, which is the most convenient way of doing the work. During the filling-up process it is necessary to hold the metal portions—that is, the rods 2 and strips 3—in proper position with reference to the center of the column. My manner of uniting the strips 3 to each other provides a convenient way of accomplishing this result. In forming the slots 4 the metal is punched out, but left attached at one end, and this punched-out portion will be bent outwardly, as indicated in Fig. 2, and provides a projection 10, which rests against the wooden mold surrounding the column, thus holding the metal structure in proper position with reference to the axis of the column. If desired, similar tongues may be punched out of the strips intermediate their ends, as shown at 11, Fig. 2. In filling the concrete in between and around the metal parts the latter are entirely embedded or enveloped in the concrete, thus protecting the metal from the action of the elements. The bands, however, encircle the major portion of the body of the concrete and prevent the same from spreading laterally, thus enabling the entire compressive strength of the concrete to be utilized in carrying the load.

In case the column is to be provided with a bracket or the like it will only be necessary to extend one or more of the strips 3 outwardly beyond the surface of the concrete of the column, as indicated at 12, Fig. 2, this projecting portion or portions serving as the horizontal part of the bracket.

By my invention it is possible to construct the columns in sections, this being illustrated in Fig. 8. Each of the sections is constructed practically in the way above described, composed of the concrete 1, vertical rods 2, and strips or bands 3. In addition to the latter each column-section will be provided at or near its end with plates or strips 13, which will be suitably united to the rods 2 of the section and which preferably will be provided with slots 14 for receiving projecting enlarged heads or ends 15 of the rods 2 of the next adjacent section. In constructing the columns in this manner the first section is built up in the ordinary way and at the top will be provided with the plates 13. The rods 2 of the next adjacent section are then passed through

the slots in the plates 13 and given a quarter-turn, thus locking them in place, and these rods are in turn connected by the strips or bands 3 and enveloped with concrete in the ordinary way. In this manner a column of any desired height can be easily constructed. When my invention is applied to piles, the latter will have a tube or tubes embedded therein to serve in sinking the piles and to permit the formation of a base thereunder by forcing concrete or cement down through the tubes.

Various modifications of the details of construction above described may be made without departing from the spirit of my invention, and I wish it understood that the claims are not limited to the precise details shown.

The strips or bands described practically form a skeleton envelop or casing for the concrete and prevent it from spreading laterally, thus preventing the fracture of the concrete on the conical lines, as heretofore, and greatly strengthening the same. The vertical rods 2 take care of the bending moment and are therefore desirable; but they are not absolutely necessary.

What I claim as my invention, and desire to secure by Letters Patent, is—

1. A column, pile, or the like, comprising a series of flat metallic strips provided with interlocking end portions and united thereby to form continuous bands, and concrete or the like enveloping and embedding said bands.

2. A column, pile or the like, comprising a series of metallic rods extending longitudinally of the column, a series of metallic strips having their meeting ends provided the one with a slot and the other with a head or enlargement whereby the same may be locked together to form a continuous band, and concrete or the like enveloping and embedding said bands and rods.

3. A column, pile or the like, comprising a series of metallic strips having their meeting ends the one provided with a head or enlargement and the other with a slot whereby the same may be united to form a continuous band, the metal punched out to form the slots being bent outwardly to form a tongue or projection for contacting with the mold, and concrete or the like enveloping and embedding said bands.

4. A column, pile or the like, comprising a series of metallic rods extending longitudinally of the column, a series of metallic strips connecting said rods, slots formed in said bands and having the punched-out portion bent outwardly to form projections to contact with the mold, and concrete or the like enveloping and embedding said strips and rods.

5. A column, pile, or the like, comprising a series of metallic strips or bands running transversely of the column, a series of rods extending longitudinally of the column and arranged in pairs, the rods of each pair passing alternately inside and outside of the bands, and concrete or the like embedding and enveloping said rods and bands.

6. A column, pile, or the like, comprising a series of metallic strips running transversely of the column and provided with interlocking end portions and united thereby to form continuous bands, a series of rods extending longitudinally of the column and arranged in pairs, the rods of each pair passing alternately inside and outside of the bands, and concrete or the like embedding and enveloping said bands and rods.

7. A column, pile, or the like, comprising a series of metallic rods extending longitudinally of the column, a series of metallic strips uniting said rods, and concrete or the like enveloping and embedding said strips and rods, one or more of said strips projecting laterally beyond said concrete to form a bracket.

8. A concrete-column section having longitudinal rods embedded therein and having plates secured to said rods at their ends, said rods projecting beyond the plates and provided with enlargements or heads, and said plates being provided with slots for receiving the ends of the rods of an adjacent section and locking the same thereto.

In testimony whereof I, the said ROBERT A. CUMMINGS, have hereunto set my hand.

ROBERT A. CUMMINGS.

Witnesses:
ROBERT C. TOTTEN,
G. KREMER.

No. 766,899. PATENTED AUG. 9, 1904.

F. POHLMANN.

CONCRETE OR LIKE GIRDER.

APPLICATION FILED JUNE 6, 1903.

NO MODEL.

Fig. 1.

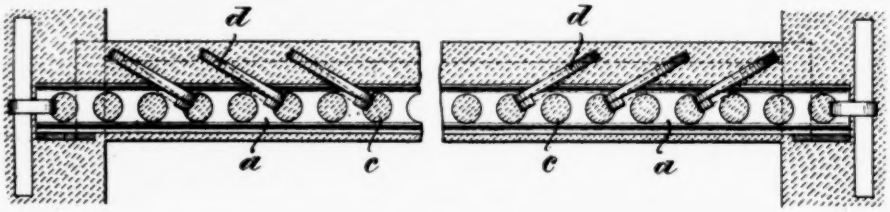


Fig. 2.

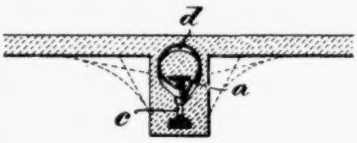


Fig. 3.

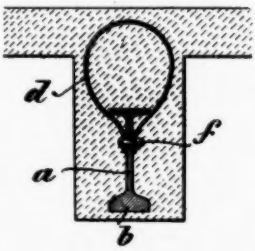


Fig. 4.

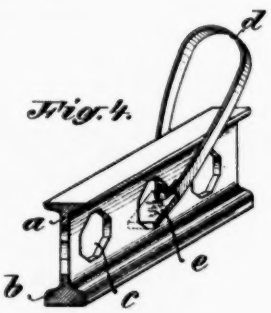


Fig. 5.

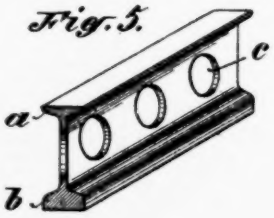
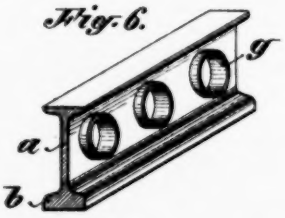


Fig. 6.



Witnesses:

Evelle A. Dick

N. H. Robbins

Inventor:

Fritz Pohlmann

by Marcellus Bailey

Atty

No. 766,899. Patented August 9, 1904.

UNITED STATES PATENT OFFICE.

FRITZ POHLMANN, OF SCHÖNEBERG-BERLIN, GERMANY.

CONCRETE OR LIKE GIRDER.

SPECIFICATION forming part of Letters Patent No. 766,899, dated August 9, 1904.

Application filed June 6, 1903. Serial No. 160,379. (No model.)

To all whom it may concern:

Be it known that I, FRITZ POHLMANN, a subject of the King of Prussia, residing at No. 37 Hohenstaufenstrasse, Schöneberg-Berlin, Kingdom of Prussia, German Empire, have invented new and useful Improvements in Concrete or Similar Girders, of which the following is a specification.

This invention relates to a new construction of concrete girder by means of which a considerable saving in iron can be effected by statically utilizing the filling material forming the connection between the ceilings and the girder.

In the accompanying drawings, Figure 1 is a longitudinal section, partly in elevation, of a concrete girder constructed in accordance with this invention. Fig. 2 s a transverse section of the same. Fig. 3 is a sectional view of the iron girder and loop. Fig. 4 is a similar view of a perforated iron girder and loop. Fig. 5 is a perspective view of the perforated iron girder. Fig. 6 is a perspective view of the iron girder with flanged holes.

Like letters indicate like parts throughout the drawings.

The upper iron flange and the upper half of an ordinary I-girder *a* is partly replaced by concrete material. A similar construction is known in armored concrete girders, where the lower flange of the girder is replaced by bar (round or square) iron surrounded by concrete; but in that case there is the drawback that the iron armor in itself before the stone or concrete material has been added has little or no stability. This drawback is obviated in the present invention by using strong rolled-iron beams *b* for the part exposed to tensile stress. Its bending strength is calculated to be sufficient for supporting the weight of the wooden binding-joists required for making the ceiling and the weight of the stone or concrete itself. In this way there is no necessity for supporting the binding-joists by scaffolding, and said binding-joists can be attached direct to the iron part in the same way as for ordinary girders, besides which the ceilings need not be made until after the roof has been completed, as the iron part of the girder sufficiently strengthens the walls. In order to make the iron part of suitable shape for its action in the stone, the mass of metal is concentrated at the part *b* subjected to the greatest stress. The cross-section is therefore unsymmetrical relatively to the horizontal axis, and the tensile stress produced in the concrete girder is taken up by the lower thickened flange *b* of the iron girder. The sheering stress acting on the concrete girder is taken up by connecting the iron part with the stone or concrete material in the best possible way. This connection is effected partly by the adhesion of iron and concrete and partly by mechanical means.

The iron part is provided throughout the whole of its length with holes *c*, arranged at small intervals and of such height as to occupy nearly the whole height of the web. When embedded in the concrete, the filled holes transmit the sheering stress produced by the tensile strains on the perforations of the iron, acting as stone rivets. In order to obtain a greater bearing-surface in the perforated girders, the holes can be provided with flanges *g*, Fig. 6.

For increasing the resistance against tensile stress metal bands or loops *d* may be attached near the ends of the iron girders by screws *f*, rivets, or the like, or they may be passed through the holes *c*, Figs. 1, 3, and 4, and secured in their position by wedges or stays *e*, Fig. 4.

What I claim as my invention, and desire to secure by Letters Patent of the United States, is—

1. In a concrete girder the combination with the concrete material, of a metal beam having an upper flange and a lower flange of greater thickness than the upper flange and a web provided with perforations extending from near the lower flange to near the upper flange.

2. In a concrete girder the combination with the concrete material, of a metal beam having an upper flange and a lower flange of greater thickness than the upper flange and a web provided with flanged perforations extending from near the lower flange to near the upper flange.

3. In a concrete or similar girder in combination with the concrete material of a metal

beam having a lower thickened flange and web with metal bands or loops attached thereto, substantially as and for the purpose stated.

4. In a concrete or similar girder the combination, of the concrete material with a metal beam having a lower thickened flange, web provided with holes, and metal bands or loops secured in said holes, substantially as and for the purpose stated.

5. In a concrete or similar girder the combination, of the concrete material with a metal beam having a lower thickened flange, web provided with holes, and metal bands or loops passed through the holes and secured in their position by wedges or stays, substantially as and for the purpose stated.

In testimony whereof I have hereunto set my hand in presence of two subcribing witnesses.

FRITZ POHLMANN.

Witnesses:
WOLDEMAR HAUPT,
HENRY HASPER.

No. 805,663. PATENTED NOV. 28, 1905.

G. L. PEABODY.

REINFORCING DEVICE FOR CONCRETE CONSTRUCTION.

APPLICATION FILED SEPT 29, 1904.

Fig. 1.

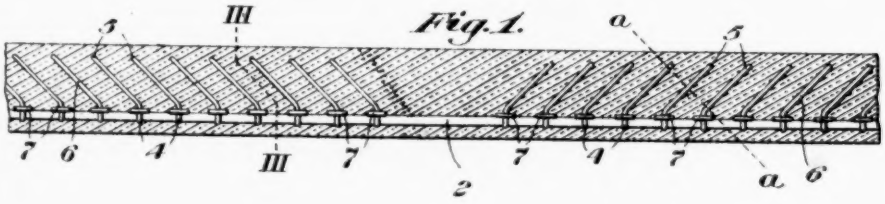


Fig. 2.

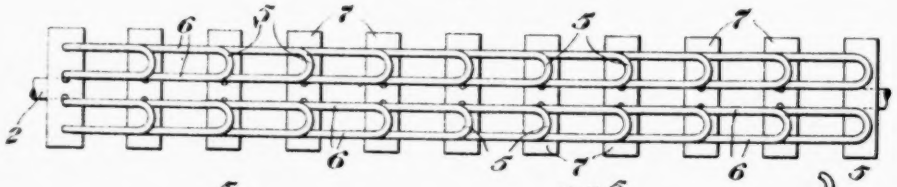


Fig. 3.

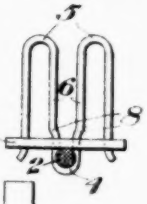


Fig. 4.

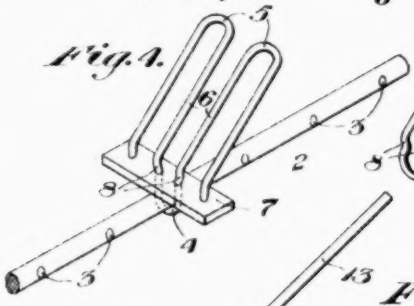


Fig. 5.

Fig. 8.

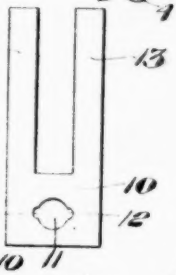


Fig. 6.

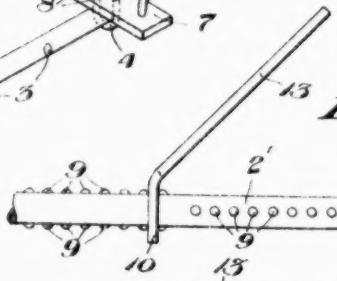


Fig. 9.

Fig. 7.

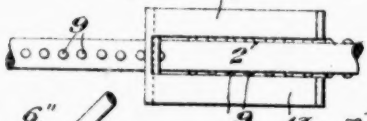


Fig. 10.

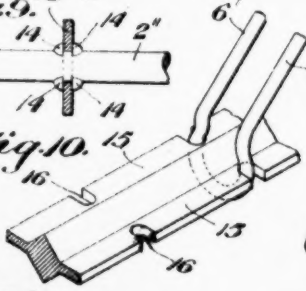


Fig. 11.

Fig. 12.

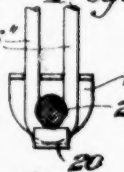


Fig. 13.

Witnesses:

A. H. King

Chas. S. Pepley

Inventor:

George L. Peabody

by C. M. Clarke

his attorney

UNITED STATES PATENT OFFICE.

GEORGE L. PEABODY, OF PITTSBURG, PENNSYLVANIA

REINFORCING DEVICE FOR CONCRETE CONSTRUCTION.

No. 805,663. Specification of Letters Patent. Patented Nov. 28, 1905

Application filed September 29, 1904. Serial No. 226,528.

To all whom it may concern:

Be it known that I, GEORGE L. PEABODY, a citizen of the United States, residing at Pittsburg, in the county of Allegheny and State of Pennsylvania, have invented certain new and useful Improvements in Reinforcing Devices for Concrete Constructions, of which the following is a specification, reference being had therein to the accompanying drawings, forming part of the specification, in which—

Figure 1 is a view in side elevation of a portion of concrete construction provided with my improved reinforcing device. Fig. 2 is a plan view, on an enlarged scale, of one end of the device. Fig. 3 is a vertical cross-sectional view on the line III III of Fig. 1. Fig. 4 is a perspective view of the portion of the bar with one of the anchoring devices attached thereto. Fig. 5 is a modified form of holding-arm. Fig. 6 illustrates in side elevation a modified construction. Fig. 7 is a plan view of Fig. 6. Fig. 8 is an end view. Fig. 9 is a detail view showing the bar pinched around the plate. Fig. 10 is a detail view showing a different form of bar. Figs. 11 and 12 show a modified construction employing a supplemental holding-clip. Fig. 13 is a detail view showing the clip detached.

My invention relates to improvements in devices for incorporation with concrete structures—as bridges, beams, girders, walls, ceilings, floors, columns, &c.; and it has for its object to strengthen and reinforce the concrete body portion constituting the floor, &c., embedded therein and provided with projecting arms or branches arranged at any angle desired and so constructed as to be adjusted to suit the requirements of use and to make and maintain a strong binding hold in the cement or concrete at closely-adjacent intervals.

The invention is designed to provide a reinforcing device which will be capable of incorporation with the concrete in such a manner as to traverse the lines of probable fracture and counteract such fracture in the best possible manner, the device being provided with a closely-adjacent plurality of such arms or with arms or branches which may be adjusted to the intervals desired or required by the work in view.

Referring now to the drawings, 2 represents the main element of the device consisting of a bar of metal of any suitable cross-section, but preferably cylindrical. The bar is provided at intervals with notches or grooves 3 on opposite sides, around which are passed the looped portion 4 of the arms, which are then extended upwardly beyond the bar 2 and bent at any desired angle and looped, as at 5. The arms are made of a heavy wire or rod 6 and may be then turned backwardly, as shown in the principal figures of the drawings, and their terminal portions connected in a cross bar or clamp 7 of any suitable construction, by which the entire arm may be tightly secured in position and to the bar 2. For the purpose of insuring the gripping action of the arms upon the bar they may be abruptly bent, as at 8, thereby forming a shoulder on the upper side of bar 7, so as to prevent their loosening or removal, and as thus constructed the arms will be rigidly attached to the main bar. It will be seen that the arms may be closely assembled, as indicated in Figs. 1 and 2, and that as thus located they cross the line of fracture, as *a a*, at least three times, thereby providing strong counteracting reinforcing devices, which effectually perform their functions. It is designed that the arms may be incorporated with the main bar at the place where used—as, for instance, in a building under construction—which feature greatly facilitates the shipment and handling of the different parts, their assemblage being a matter of simple and easy accomplishment by any mechanic.

It will be understood that any suitable device may be used for the arms, and in Figs. 6, 7, and 8 I have shown a bar 2′, provided with series of abutments 9, located in oppositely-arranged series of rows with an intervening space between the abutments for the insertion of a holding-arm of the character shown in these figures, made of a plate of sheet metal 10, having an aperture 11 for the bar and registering openings or slots 12 to facilitate its insertion upon the bar, the plate being provided with one or more upwardly-bent projections 13, arranged at any suitable or desired angle, as already described.

In Fig. 9 the bar 2″ is originally smooth on its exterior, the plate 10 or any other suitable branch device being provided with a corresponding aperture slipped over the bar and secured thereon by holding-lugs 14, pinched or upset from the metal of the bar, so as to securely bind on each side of the plate and hold it in position, the plates being thus attached at any desired interval apart.

In Fig. 10 the bar is shown as provided with lateral flanges 15 15, having notches or apertures 16 at the desired distances apart,

which engage the arms 6', as shown, the arms being tightened or fastened upon the bar in any suitable manner.

In Figs. 11 and 12 the bar is provided with the notches 3, already described, the arm extremities 6'' being attached in the manner shown, and are further secured by a supplemental clip 17, consisting of a plate of sheet metal having an opening 18 for the bar and apertures 19 in its upper edge, which edge may be bent over, the clip being provided with a terminal tongue 20, which is bent up around the lower portion of the arms, as shown, thereby securely attaching it to the main bar.

All of these various devices are suitable for the objects in view and provide a main bar having rigidly-connected projecting arms capable of being bent to any desired angle and to maintain their position with relation to the bar, so as to transmit to it the various strains to which the concrete structure is subjected.

It will be understood that various other devices or constructions of holding-arms may be incorporated with the bar, and all such various changes or modifications which may be made by the skilled mechanic are to be considered as within the scope of the following claims, as I do not desire to be limited to the exact construction shown and described.

Having described my invention, what I claim is—

1. A reinforcing device for concrete, &c., consisting of a main bar provided with a series of notches, and holding-arms surrounding the bar in engagement with said notches and projecting laterally from the bar, substantially as set forth.

2. A reinforcing device for concrete, &c., consisting of a main bar provided with a series of notches, holding-arms surrounding the bar in engagement with said notches and projecting laterally from the bar, with securing devices for the arms, substantially as set forth.

3. The combination with a main bar provided with a series of notches formed between adjacent shoulders, of holding-arms surrounding the bar and in engagement with said shoulders, and provided with apertures adapted to provide clearance therefor in assembling the arms with the bar, substantially as set forth.

4. The combination with a main bar provided with a series of notches, of oppositely-disposed series of holding-arms surrounding the bar in engagement with said notches and projecting laterally from the bar and toward each end respectively beyond its middle portion, substantially as set forth.

5. A reinforcing device for concrete, &c., consisting of a main bar provided with a series of notches, and holding-arms surrounding the bar in engagement with said notches and projecting upwardly and outwardly toward the ends of the bar, substantially as set forth.

In testimony whereof I affix my signature in presence of two witnesses.

GEORGE L. PEABODY.

Witnesses:
R. H. McLARN.
C. M. CLARKE.

No. 815,157. PATENTED MAR. 13, 1906.

J. F. GOLDING.

TENSION BAR FOR USE IN CONCRETE AND THE LIKE.

APPLICATION FILED FEB. 20, 1905.

Fig. 1.

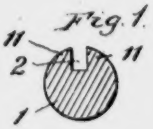


Fig. 2.

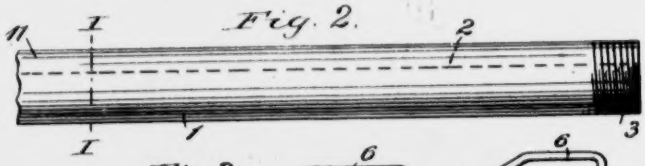


Fig. 3.

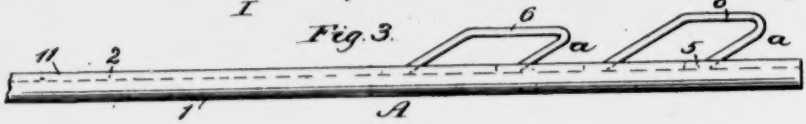


Fig. 4

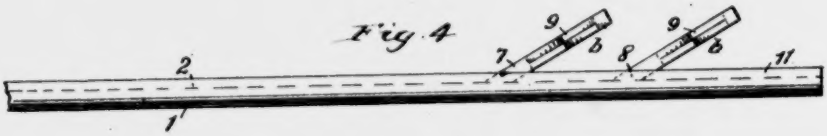


Fig. 5.

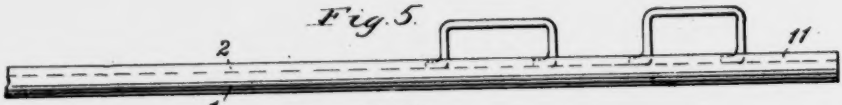


Fig. 7.

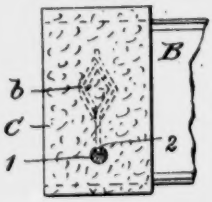


Fig. 10

Fig. 6.

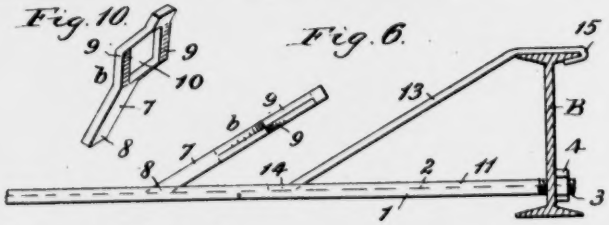


Fig. 8.

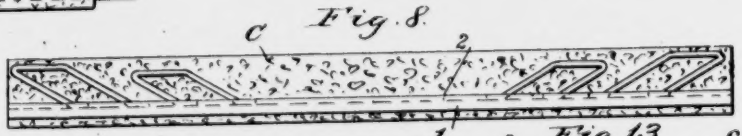


Fig. 9.

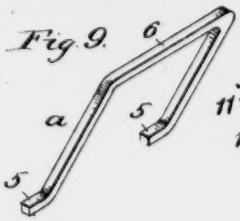


Fig. 11.

Fig. 12.

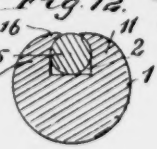
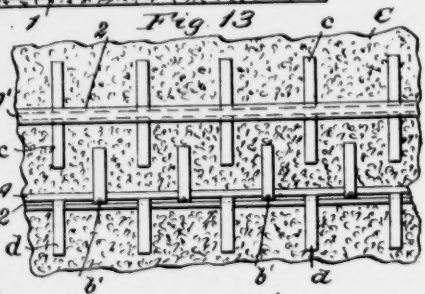


Fig. 13



Witnesses:
G. S. Barker
H. B. Pitts.

Inventor:
John F. Golding
by H. N. Low
atty.

UNITED STATES PATENT OFFICE.

JOHN F. GOLDING, OF WASHINGTON, DISTRICT OF COLUMBIA, ASSIGNOR TO MONOLITH STEEL COMPANY, INCORPORATED, A CORPORATION OF VIRGINIA.

TENSION-BAR FOR USE IN CONCRETE AND THE LIKE.

No. 815,157. Specification of Letters Patent. Patented March 13, 1906.

Application filed February 20, 1905. Serial No. 246,609.

To all whom it may concern:

Be it known that I, JOHN FRENCH GOLDING, a citizen of the United States, residing at Washington, District of Columbia, have invented certain new and useful Improvements in Tension-Bars for Use in Concrete and the Like, of which the following is a specification.

My invention relates to the strengthening of cement, concrete, and the like where these materials are employed in various structures; and it consists in a tension-bar adapted to be embedded in or surrounded by such materials, the bar comprising a main longitudinal member and inclined members provided with concrete engaging or locking portions which are so arranged as to obtain a positive hold upon the material at a distance from the bar as distinguished from a mere skin frictional engagement, whereby the cracking of the material is prevented when the structure is subjected to strain and the separation of the different parts of the body of material from each other or from the said main member is rendered impossible.

It further consists in a tension-bar of peculiar construction; also, in such a bar suitably embedded in concrete or the like; also, in the parts and combinations thereof hereinafter set forth and claimed.

In order to make the invention clearly understood, I have shown in the accompanying drawings means for carrying the same into practical effect without limiting my improvements in their useful applications to the precise constructions and arrangements which, for the sake of example, I have delineated.

In said drawings, Figure 1 is a sectional view of the main longitudinal member of a tension-bar embodying my invention on line I of Fig. 2. Fig. 2 is a side view of a portion of said main member. Fig. 3 is a side view, on a smaller scale, of a portion of my improved tension-bar, showing two of the inclined or supplemental members combined with the main longitudinal member. Fig. 4 is a similar view showing supplemental members of a different form also embodying the invention. Fig. 5 is a side view showing another form of supplemental member. Fig. 6 is a side view, partly in section, of a portion of the tension-bar united with one of the floor-beams. Fig. 7 is a sectional view at right angles to Fig. 6, showing also the body of concrete around the tension-bar. Fig. 8 is a vertical sectional view of a concrete floor or beam containing a tension-bar of the form shown in Fig. 3. Figs. 9 and 10 are perspective views of the supplemental members shown, respectively, in Figs 3 and 4. Figs. 11 and 12 are sectional views across the tension-bar at the point where it is united with a supplemental member, said views showing, respectively, a supplemental member of square cross-section and one of round cross-section. Fig. 13 is a plan view, partly in section, of a portion of a floor having tension-bars embodying my invention, in this instance the supplemental members extending horizontally on each side of the grooved member.

I have herein shown and described the tension-bar as combined in a floor; but it will be understood that the invention is not confined to use in such particular structure. The word "concrete" as used herein is intended to cover all built-up structures of similar or analogous materials.

Referring to the drawings, 1 indicates the main or longitudinal member of the tension-bar A, made of suitable material, such as iron or steel, to have the necessary tensile strength. The member 1 is rolled or otherwise formed with a longitudinal surface-groove 2, extending for a portion of or by preference for the entire length of the member, and leaving a relatively heavy main body from and beyond which extend the opposing lips 11. When the bar A is combined in a floor, as shown in Figs. 7 and 8, the member 1 is laid substantially horizontally with the groove 2 on the upper side. The member 1 is or may be provided at its ends with screw-threads 3 and nuts 4, as indicated in Figs. 2 and 6.

In Fig. 3 the supplemental members are shown at *a* extending in an inclined direction upward and away from the member 1. They are provided with feet 5, securely held in the groove 2 and at a distance from the member 1, with concrete engaging or locking portions 6 arranged crosswise of or at an angle to the general direction of the supplemental member, so as to obtain a positive hold or lock on or in the concrete. Thus the portions 6 may be parallel with the member 1, as shown in Figs. 3, 5, and 8. In this particular construction of supplemental member (shown at *a*) it is formed of a bar of metal the middle of which

forms the engaging or locking part 6, the ends of which are legs extending in an inclined direction to the member 1 and the extremes of which constitute the feet 5. In order to effect the most economical distribution of metal, I usually prefer to make the supplemental members progressively a little longer or higher as the end of the main bar is approached, as indicated in Figs. 3, 5, and 8.

Another form of supplemental member is shown in Figs. 4, 6, 7, and 10 at *b*, the same having a single leg 7 and foot 8. The concrete engaging or locking portions are formed by the limbs 9 of eyes or loops 10. The latter are of diamond or other suitable shape. The members shown at *b* are or may be short sections of the tension-bar which is the subject of my Patent No. 758,061, dated April 26, 1904. The legs of the supplemental members may extend at right angles to the bar 1 instead of being inclined, as seen in Fig. 5.

The tension-rod described is or may be delivered in a knockdown condition, the supplemental members separate from the main member 1. The parts are then assembled according to the requirements of the floor or other structure, the supplemental members being spaced apart or arranged as desired in the groove 2 of the member 1, and the feet of the supplemental members are secured by forcing inward the lips or parts 11, which extend outward from and beyond the main body of the member 1, with a suitable press or swage, so as to permanently set the metal of the member 1 against or onto the sides of the supplemental members. The tension-bar A may, however, be completed for use at the factory, in which case the parts may be permanently united by a rolling process, the bar with the supplemental members inserted in its groove being passed between grooved rollers suitably shaped to upset, bend, or compress the metal of the member 1, as desired.

The preferred manner of attaching the tension-bar to the supporting-beams is shown in Fig. 6, where one of such beams is indicated at B. The end of the member 1 is inserted through an aperture in the lower part of the vertical web of the beam, and the nut 4 is set up against the web. The other end of the member is similarly secured to another beam. 13 is a tie-rod having a foot 14 secured in the described manner in the groove 2 and which extends thence in an inclined direction to the top of the beam, where it is provided with a hook 15, which engages the top flange or other convenient part of the beam. The tie strengthens and supports the member 1, strengthens the concrete at one of its points most subject to heavy strain, and keeps the tension-bar A upright during building.

The supplemental members may be of square, round, or other cross-section. The thickness of the supplemental member or of its foot may be a little less than the depth of the groove 2, Figs. 11 and 12, in which case the edges of the groove are or may be bent partly over or around the foot of the supplemental member, as indicated at 16 in said figures.

C is a body of concrete representing a floor, beam, or other structural element. It incloses the bar A and enters the spaces between or within the supplemental members.

In Fig. 13 I have shown supplemental members consisting of plain straight bars secured in the grooved bars, as already described. In this construction the supplemental members are arranged horizontally. The bar shown at A′ has two of the described grooves opposite to each other, one on each side of the bar, and the supplemental members *c* are secured some in one groove and some in the other, extending in opposite directions from the grooved bar. The bar shown at A is similar to that shown in the other figures and has the groove on its upper side. The supplemental members *d* have downwardly-bent feet *b*′, seated in the groove 2, and thence extend horizontally to each side of the bar A.

Where tension-bars are constructed with the supplemental or concrete-locking members integral with the part or parts that act as tension members, the latter cannot well be of the highest tensile strength on account of the concomitant hardness and the difficulty of cutting and forming the supplemental members from it. My present improvement allows the member 1 to be made of the highest tensile strength without encountering said difficulty, and I can get the same structural strength with less metal and weight. Also I am enabled to closely adapt the tension-bar at the place of building to the requirements of the structure, doing away with the necessity of having made to order at the factory in complete form the various tension-bars for the different parts of the building. It will be further noticed that the described means for securing the supplemental members to the member 1 leaves to the latter the full tensile strength of the metal which is contained in it. In other words, there is no metal which is wasted for tensile purposes, as would be the case if the member 1 were perforated or cut away on transverse lines.

The feet of the supplemental members are extended longitudinally in the groove of the main bar sufficiently to enable the bar to have a firm and secure hold on the supplemental member. This may be effected in different ways—for instance, by making the supplemental member wide in the direction of the groove, as shown at 8, Figs. 6 and 10, or by bending such feet in a direction parallel with the groove, as shown at 5, Figs. 3 and 9. It is to be understood that the word "ten-

sion" is herein used in connection with the bar 1 to indicate its general function in receiving the strains imposed by the concrete and its load and not in such a narrow sense as to exclude the use of my improvement from columns or other situations in which it would receive other than simple tension strains. Important advantages result from making the main bar 1 with a continuous groove or grooves. When of such shape, it can be very economically produced by a rolling process. The groove-producing flange of the roll enters and rolls and finishes the interior of the bar to a material degree, thereby giving to the bar an extra amount of rolled tough skin or surface and increased tensile strength. The bar is or may be of uniform cross-section, having no waste metal which is not utilized for strengthening purposes. The supplemental members can be arranged at any desired points along the bar, according to the requirements of the structure or building, and there secured with the greatest firmness. The grooves at their portions which are not occupied by the supplemental members are open to receive the concrete or cement and unite the bar with the same against lateral strains, giving the bar also a strong frictional hold on the concrete to prevent longitudinal displacement. In assembling the supplemental members with the bar the former will readily become seated in the groove without its being necessary to exercise great particularity as to their exact location longitudinally of the bar. The parts can be united by a simple rolling process, the bar having the supplemental members inserted in its groove or grooves being passed between rolls, which act on it from end to end and bring the walls of the groove or grooves to bear securely against the sides of the supplemental members. If the bar is not of too great cross-section, such assembling-rolls may compress the bar as a whole to bring the walls of the grooves nearer together; but my improvements are not to be limited to such precise mode of securing the parts together. If the bar be of such size that it cannot be readily compressed as a whole, I may cause the rolls to act along those parts of the bar between which the groove is situated or I may use a swaging process, as already explained.

What I claim is—

1. The combination, with a body of concrete, of a metal bar supporting such concrete and formed with a continuous longitudinal groove, and one or more supplemental members arranged in said groove at the desired points in the length of the bar and secured in the groove, substantially as and for the purposes described.

2. A metal strengthening-bar for use in concrete and the like, said bar being formed with a continuous longitudinal groove, in combination with one or more supplemental members adjustable along the groove of the bar to the desired points, the bar being adapted to be upset to secure the supplemental members, substantially as and for the purposes described.

3. The combination, with a body of concrete, of a metal bar surrounded by such concrete and formed with a continuous longitudinal groove, and one or more supplemental members secured in such groove, the open portion of the groove being adapted to receive therein, and obtain a hold on, the concrete, substantially as and for the purposes described.

4. A tension-bar for use in concrete and other purposes, consisting of a main, longitudinal, continuously-grooved member, and supplemental members arranged at desired points along the groove of said main member and having their feet or ends extending longitudinally in the groove, the metal of the main member being permanently upset to cause the walls of the groove to rigidly secure said supplemental members, substantially as set forth.

5. A tension-bar consisting of a main, longitudinally and continuously grooved member 1, and a supplemental member *a* formed with a longitudinal portion 6 arranged at a distance from the main member and with legs extending to said main member, the ends of said legs being arranged within the groove of the main member and the metal of the main member being permanently upset to cause the walls of the groove to rigidly secure such ends, substantially as set forth.

6. A tension-bar adapted to be supplied in an unassembled or knockdown condition, consisting of a main longitudinal member formed with a continuous groove 2, and supplemental members having parts fitting said groove and adapted to be arranged along such groove and spaced apart as desired, the main member being of malleable material for the securing of the supplemental members by the permanent upsetting of the material of the main member as described.

7. The combination of the tension-bar, consisting of a longitudinal and continuously-grooved member, beams supporting the ends of said longitudinal member and a tie engaging the upper part of the beam, extending in an inclined direction to said longitudinal member and having its end or foot secured by compression in the groove of the longitudinal member, substantially as set forth.

8. In combination with a body of concrete or the like, a tension-bar consisting of a main longitudinal member having a relatively heavy main body and formed with opposing lips extending outward from and beyond the main body, such lips producing a continuous groove wherein the concrete can enter, and

supplemental members arranged at desired points along the said main member and having their feet or ends between such lips, such main member having its metal permamently upset to cause the lips to rigidly secure such supplemental members, and said body of concrete being arranged to surround and engage the bar and the supplemental members and to enter between said lips of the bar, substantially as set forth.

In testimony whereof I affix my signature in presence of two witnesses.

JOHN F. GOLDING.

Witnesses:
H. N. Low,
Wm. H. De Lacy.

273

No. 815,409. PATENTED MAR. 20, 1906.

R. A. CUMMINGS.

CONCRETE AND METAL STRUCTURE.

APPLICATION FILED OCT. 1, 1904.

2 SHEETS—SHEET 1.

FIG. 1

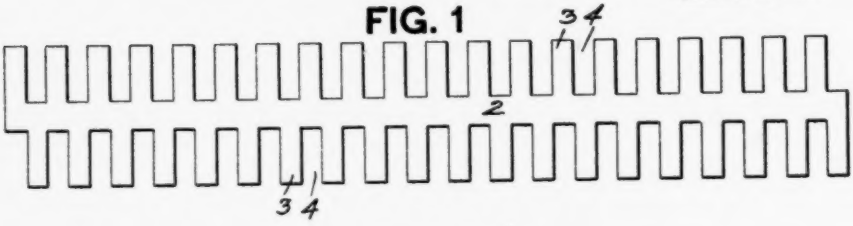


FIG. 2

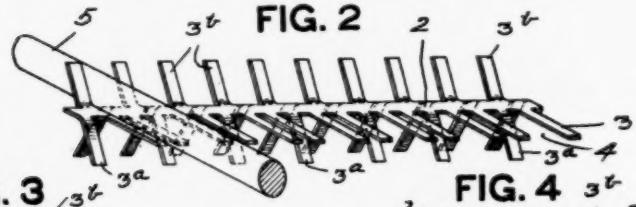


FIG. 3

FIG. 4

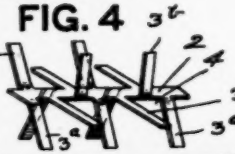


FIG. 5

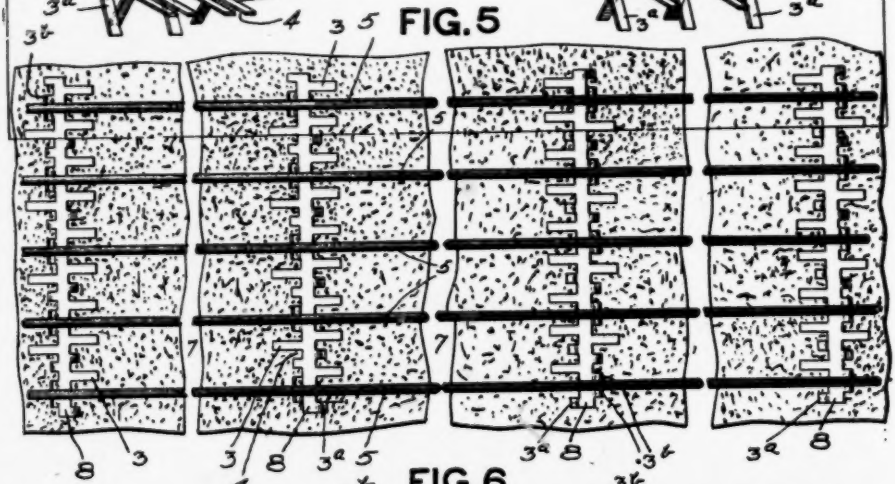
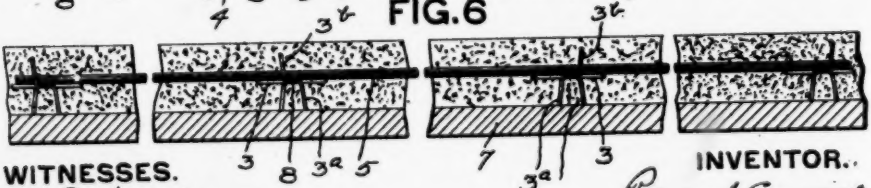


FIG. 6



WITNESSES.

J. R. Keller

Robert C. Totten

INVENTOR.

Robert A. Cummings

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attorneys

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No. 815,409. PATENTED MAR. 20, 1906.

R. A. CUMMINGS.

CONCRETE AND METAL STRUCTURE.

APPLICATION FILED OCT. 1, 1904.

2 SHEETS—SHEET 2.

FIG. 7

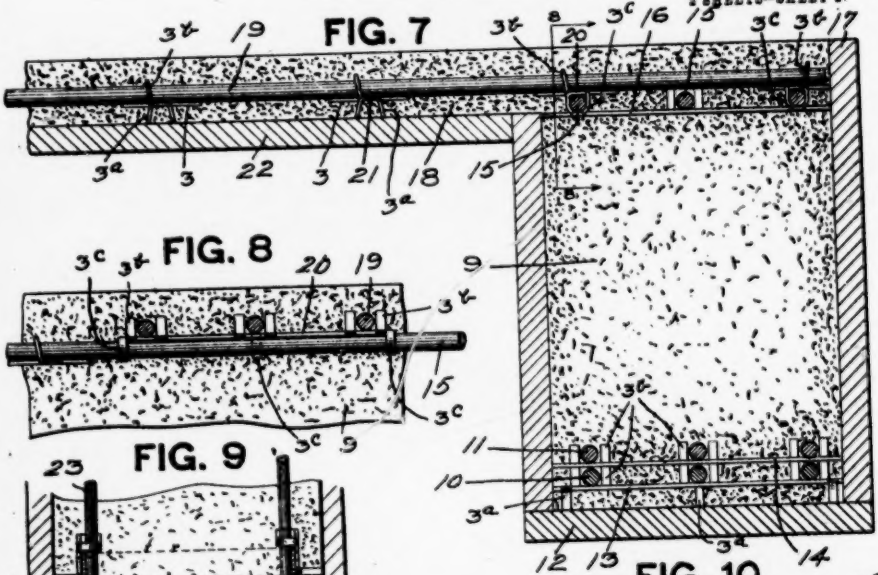


FIG. 8

FIG. 9

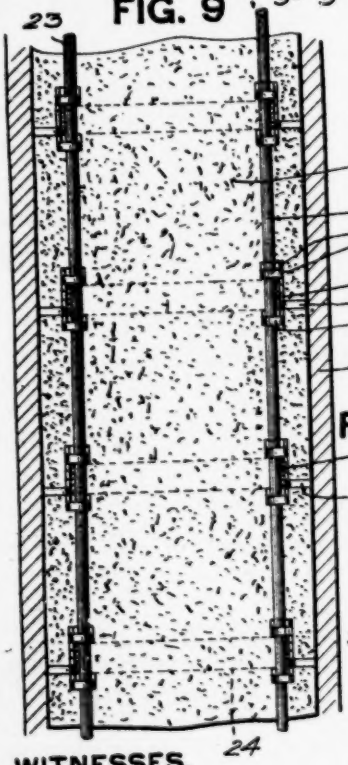


FIG. 10

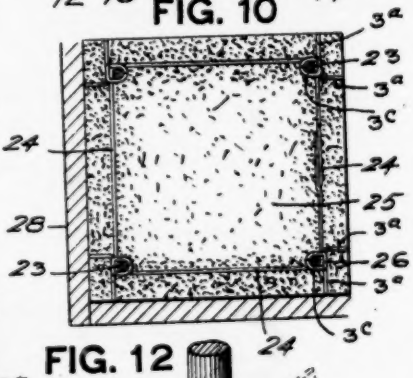


FIG. 11

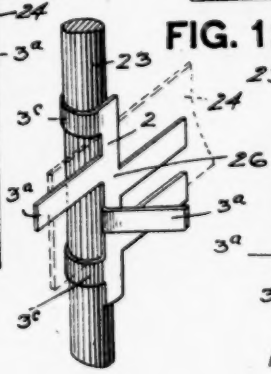
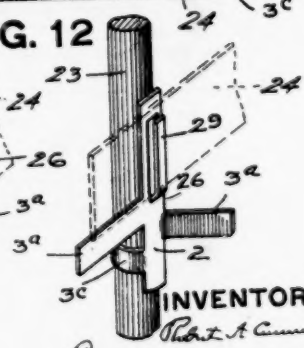


FIG. 12



WITNESSES.

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Robert A. Cummings

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UNITED STATES PATENT OFFICE.

ROBERT A. CUMMINGS, OF BEAVER, PENNSYLVANIA.

CONCRETE AND METAL STRUCTURE.

No. 815,409. Specification of Letters Patent. Patented March 20, 1906.

Application filed October 1, 1904. Serial No. 226,821.

To all whom it may concern:

Be it known that I, ROBERT A. CUMMINGS, a resident of Beaver, in the county of Beaver and State of Pennsylvania, have invented a new and useful Improvement in Concrete and Metal Structures; and I do hereby declare the following to be a full, clear, and exact description thereof.

My invention relates to composite metal and concrete structures, such as bridges, viaducts, reservoirs, floors, roofs, walls, columns, piles, struts, and other portions of fireproof buildings and other structures.

The object of my invention is to provide a spacing and supporting member for holding the metal reinforcements of the concrete in proper position relative to each other and to the centering or casing used in forming the concrete.

Concrete and cement are at present very largely used for building many kinds of structures which formerly were built of metal, masonry, or the like. The concrete possesses great compressive strength when properly constructed and supported and is not affected by fire, water, or other elements and for these reasons is highly desirable in many building constructions. It, however, possesses very little tensile strength, and therefore it is customary to reinforce the same by embedding in it suitable metallic reinforcing members or bars, known technically as "core bars" or "units," which supply the requisite tensile strength to the material. It is the custom to place the metallic reinforcing members in position in the structure and in proper relation with reference to the centering or casing onto or into which the cement is to be filled and then to fill the cement into the casing or onto the centering and around the reinforcing members. These metallic reinforcing members very frequently are of light weight, being either thin metallic bands or rods from one-fourth inch upward in dimensions. They therefore are quite flexible and difficulty is experienced in holding them in proper relative position one to the other and also in proper position with relation to the centering or casing. This is essential in order that these members may be so distributed in the concrete as to give the greatest strength thereto.

My invention relates especially to means for holding the reinforcing members in proper relative position one to the other and to the centering or casing.

The invention consists, generally stated, in a supporting and spacing member formed, preferably, of sheet metal and provided at its edges with projecting tongues or fingers which are adapted to be bent some in one direction and some in the other, those bent in one direction serving to space this member and the reinforcing members supported thereby the proper distance from the centering or casing and those bent in the opposite direction serving to hold the reinforcing members the proper distances apart.

In the accompanying drawings, Figure 1 is a plan view of a metal sheet cut to the proper form for making the supporting and spacing member. Fig. 2 is a perspective view of a completed member, showing the manner of holding the core-bars. Figs. 3 and 4 are similar views showing modifications. Fig. 5 is a plan view showing the manner of applying the spacing members in the formation of floor and similar concrete structures. Fig. 6 is a section on the line 6 6, Fig. 5. Fig. 7 is a section showing the application of the spacing member to girder constructions. Fig. 8 is a section on the line 8 8, Fig. 7. Fig. 9 is a vertical section showing the application of the supporting and spacing member to the building up of a column and the like. Fig. 10 is a horizontal section through the same. Fig. 11 is a perspective detail of the column-work, and Fig. 12 is a similar view showing a modification.

My invention comprises a supporting and spacing member having a body designed to be placed horizontally or vertically, according to the character of work to be performed, and provided on its longitudinal side edges with projecting tongues, fingers, or the like, some of which may be bent in one direction and some in another. This supporting and spacing member may be formed of wire, malleable casting, or other material. Preferably it will be formed of sheet metal of a thickness depending on the character of work. In some cases it may be of exceedingly thin metal—say twenty-eight gage; but for heavier work it will be materially thicker. This sheet metal will be used in the form of strips and of a length varying with the work to be performed. Each strip is provided with its side edges provided with slits, so as to form tongues or projections.

In Fig. 1 is shown a suitable strip cut to form a spacing member. This strip has the central longitudinal unslitted body portion

2 and on the edges is provided with projecting tongues 3, separated by interdental spaces 4. These spaces 4 might be so narrow as to form mere slits; but it is preferred to have a portion of the metal removed, so as to make comparatively wide spaces. Some of the projecting tongues 3 will be bent in one direction to form the legs or distance members 3^a, and others will be bent in the opposite direction to form the means 3^b for spacing the reinforcing members or core-bars 5. Preferably the projections or tongues will be arranged alternately on the two sides, as shown in Fig. 1, instead of opposite each other, as thereby greater flexibility in spacing the core-bars or a greater range of dimensions of the spaces between the upturned members can be obtained. Any of the projecting tongues may be turned upwardly, as desired or necessary, to form holding means properly spaced apart for the metallic reinforcing members, while other of said tongues can be turned down to form the necessary number of distance pieces or legs. The number turned up will vary according to the number of reinforcing members to be held by the spacing member and the distances between adjacent ones will vary largely. Fig. 3 shows two adjacent fingers on the same side turned up, thus forming a narrow space for holding a small core-bar. Fig. 4 shows one finger on one side and another on the other side turned up to form a wide space for a larger core-bar, and Fig. 2 shows the two turned-up fingers on the same side of the strip, but not adjacent ones, thus making a still wider space for a large core-bar. The number turned down to form the legs will be sufficient to properly support the member and reinforcements in proper position with reference to the centering or casing. All other projections or tongues can be left unbent. The blank shown in Fig. 1 is a standard blank which can be adapted at the place of use to a variety of uses and to various numbers or characters of metallic reinforcing members to be held thereby, the projecting tongues being capable of being bent into place by hand or by a simple tool. It will be necessary only to stamp out the sheet-metal blanks to the form shown in Fig. 1 and then carry the same to the place of use. This one blank will be sufficient for any use to which it can be put. If desired, different sizes or weights of blanks can be manufactured; but a single one will be found suitable for most purposes. This spacing member can be used in a large variety of ways, and in the drawings I have shown several manners of applying the same; but it will be understood that these are for purposes of illustration largely and do not show all manners of using the same.

In Figs. 5 and 6 the spacing member is shown applied in the formation of floors, roofs, and similar structures. The centering is shown at 7, and the spacing members 8 are placed upon the same, having the legs 3^a resting thereupon. The reinforcing members or core-bars are shown at 5, and the spacing member will have as many fingers 3^b turned upwardly as will be necessary to hold the core-bars in the proper relative position with reference to each other. The body 2 of the spacing members lies in a horizontal plane and merely serves as a support upon which the reinforcements rest. The legs 3^b of course can be made of any desired length so as to hold the reinforcements the proper distance above the centering. As many spacing-pieces will be used as necessary to support the reinforcements along their entire length. The concrete is filled onto the centering and around these reinforcements and spacing members in the usual way, and when said concrete sets the centering is removed, thus leaving a reinforced concrete structure in which the reinforcements or core-bars are properly distributed, so as to give the maximum strength to the structure.

In Figs. 7 and 8 I have illustrated the spacing member applied in the building up of main and cross girders. The main girder 9 is shown as provided with rows of reinforcements 10 and 11, located near the bottom thereof. The lower row of reinforcements is held in proper position above the casing 12 and properly spaced one from the other by a spacing member 13. The upper row of reinforcing members 11 is supported by a spacing member 14, laid upon the lowermost row of reinforcing-bars and merely having upward projections 3^b, so as to properly space apart said reinforcing members 11. Near the top of the girder there are also applied several reinforcements 15, which are supported and held apart by a spacing member 16, suitably secured at its ends to the casing 17, or the concrete may first be partly filled in, then the member 18 laid thereon. 18 represents a cross-girder resting partly on top of the main girder 9. This also is provided with a series of reinforcing members 19, which are supported and spaced apart by a member 20, having upturned fingers 3^b for spacing apart the reinforcements 19 and having downturned fingers 3^c bent around one of the core-bars 15. In this manner the spacing member is attached to said core-bar and serves to support and space apart the reinforcements 19 of the cross-girder. Other spacing members 21 support the reinforcements 19 above the centering 22. The concrete in this case is filled into the casing and around the reinforcing and spacing member, and when set the casing and centering is removed. The result is that all of the reinforcements in the main and cross girders are so distributed that the maximum strength is obtained.

In Figs. 9 to 12 I have shown my spacing member applied in the building up of col-

umns or similar structures. The column is provided with vertical strengthening or reinforcing members 23 and with bands 24, which surround the concrete 25, so as to prevent the same from spreading outwardly and fracturing. The spacing-pieces are shown at 26. They have some of their fingers 3^c bent around one of the vertical reinforcements 23 and other of the fingers 3^a projecting outwardly and bearing against the casing 28, so as to hold the vertical members 23 a proper distance away from said casing. The bands 24 are located either between the verticals 23 and body 2 of the spacing member and are thereby prevented from falling down, as shown in Fig. 11, or said bands are held against falling by tongues 29, punched out of the body of the spacing members, as shown in Fig. 12. With the metallic members held in this position the concrete is filled into the casing and around the metallic portions, entirely embedding the same. These metallic portions are held in proper vertical position so that the resultant column has the vertical members properly distributed therein and entirely embedded in the concrete.

The application of the spacing member and clip to column-work, as shown in Figs. 9 to 12, is not claimed herein, but is claimed in my application, filed October 22, 1904, Serial No. 229,635.

Many other applications of my spacing member will suggest themselves to those skilled in the art. In all cases, however, this member serves to properly space the reinforcing members away from the centering or casing, so that said spacing members will be entirely covered by the concrete, and thus not exposed to the air and resultant corrosion, and will also hold said members the requisite distance from the top of the floor, column, or other structure, so as to get the necessary strength. The spacing member also serves to hold the reinforcing members in proper relative positions one to another, so that they will be properly and uniformly distributed in the concrete. The spacing member itself is very simple and can be very cheaply made. It is so constructed that a single size and design of spacing member is adapted for a large variety of uses, in that manner making special dies and designs unnecessary and very greatly reducing the cost of manufacture.

What I claim is—

1. A member for spacing and supporting bars in metal and concrete work, comprising a metal plate having tongues or projections formed on its side edges and separated by interdental spaces, some of its tongues on both edges being bent in one direction and adapted to contact with the centering or casing, and others of said tongues being bent in the opposite direction and serving to space apart reinforcing-bars extending transversely of said member.

2. A member for spacing and supporting bars in metal and concrete work, comprising a sheet-metal strip having tongues or projections formed on its side edges, some of said tongues on both edges being bent in one direction and adapted to contact with the centering or casing, and others of said tongues being bent in another direction and serving to space apart reinforcing-bars extending transversely of said member.

3. A spacing and supporting member for metal and concrete reinforced work, comprising a metal strip having projecting tongues formed on its side edges, said tongues alternating on the two edges, and some on both edges being bent in one direction and others in another direction.

4. In concrete and metal structures, the combination of a member having fingers projecting at an angle to its body and in opposite directions, and metallic members extending transversely of said member held by the fingers projecting in one direction, the fingers projecting in the opposite direction serving to contact with the centering or casing.

5. In concrete and metal structures, the combination of metallic reinforcing members, spacing-pieces comprising metallic strips having projections on the edges, some being bent in one direction to space and support the reinforcing members and others being bent in the opposite direction to contact with the centering or casing, and concrete enveloping and embedding said reinforcing and spacing members.

6. In concrete and metal structures, the combination of metallic reinforcing members, a spacing member comprising a sheet-metal strip provided with projections or tongues on its side edges and arranged alternately, some of said projections being bent in one direction to space apart the reinforcing members and others being bent in the opposite direction to contact with the centering or casing, and concrete or the like enveloping and embedding said reinforcing and spacing members.

7. In metal and concrete structures, the combination of metallic reinforcing members, metallic spacing members having on their side edges fingers or projections, some of which are bent in one direction around one metallic member and others of which are bent in the opposite direction, and concrete or the like enveloping and embedding said reinforcing and spacing members.

8. In metal and concrete structures, the combination of metallic reinforcing members, a spacing member comprising a metal body provided on its edges with projections, some of which are bent in one direction and around a reinforcing member, and others of which are bent in the opposite direction and serve to space apart others of the reinforcing members, and concrete and the like enveloping

and embedding said reinforcing and spacing members.

9. In metal and concrete structures, the combination of metallic reinforcing members, a spacing member comprising a metal body provided on its edges with projections, some of which are bent in one direction and around one of the reinforcing members, and others of which are bent in the opposite direction and serve to space apart others of the reinforcing members, said projections being alternately arranged on the two side edges of said strip and concrete or the like enveloping and embedding said reinforcing and spacing members.

In testimony whereof I, the said ROBERT A. CUMMINGS, have hereunto set my hand.

ROBERT A. CUMMINGS.

Witnesses:
ROBERT C. TOTTEN,
G. C. RAYMOND.

No. 822,587. PATENTED JUNE 5, 1906.

R. A. CUMMINGS.

METAL REINFORCED CONCRETE COLUMN.

APPLICATION FILED JAN. 6, 1905.

FIG. 1

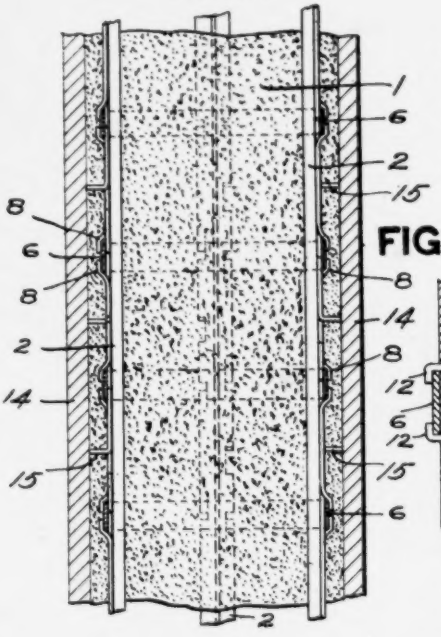


FIG. 2

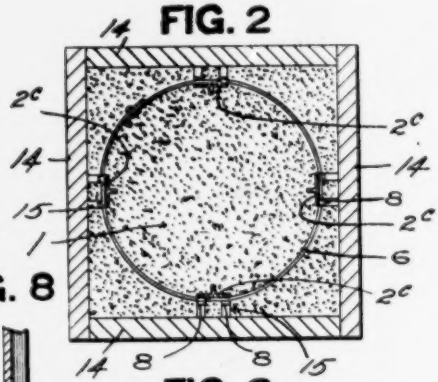


FIG. 8

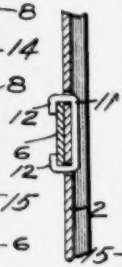


FIG. 3

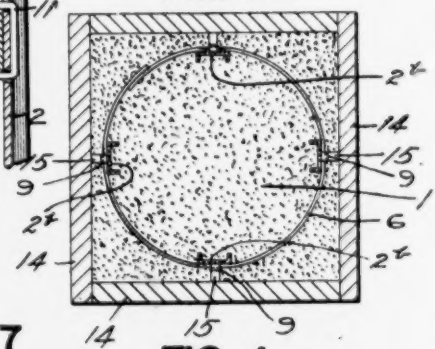


FIG. 5

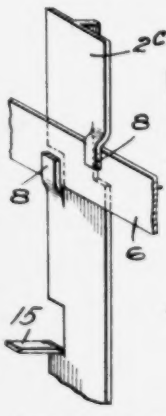


FIG. 6

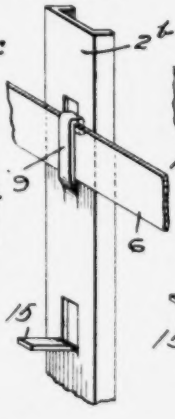


FIG. 7

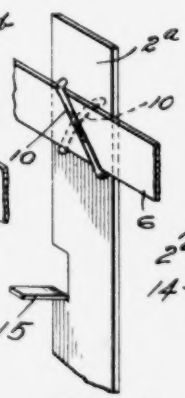


FIG. 4

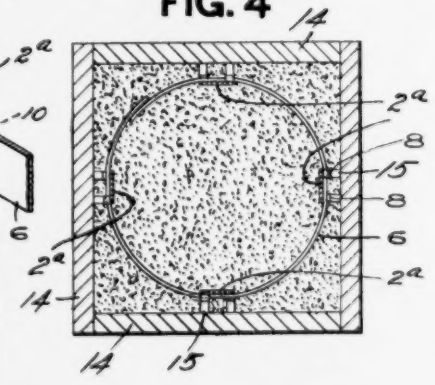
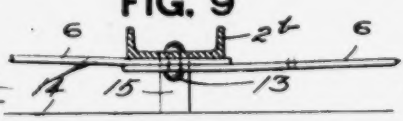


FIG. 9



WITNESSES.

J. R. Keller

Robert C. Totten

INVENTOR.

Robert A. Cummings

By King Totten & Wurtz attorneys

UNITED STATES PATENT OFFICE.

ROBERT A. CUMMINGS, OF BEAVER, PENNSYLVANIA.

METAL-REINFORCED CONCRETE COLUMN.

No. 822,587. Specification of Letters Patent. Patented June 5, 1906.

Application filed January 6, 1905. Serial No. 239,882.

To all whom it may concern:

Be it known that I, ROBERT A. CUMMINGS, a resident of Beaver, in the county of Beaver and State of Pennsylvania, have invented a new and useful Improvement in Metal-Reinforced Concrete Columns; and I do hereby declare the following to be a full, clear, and exact description thereof.

My invention relates to concrete cloumns, piles, struts, and the like used in bridges, viaducts, docks, fireproof buildings, and other structures.

The object of my invention is to provide a column or the like which is composed mainly of cement or concrete and which will carry a very heavy load.

Concrete or cement possesses great compressive strength when properly constructed and supported and is also not affected by fire, water, or other elements. For these reasons it is highly desirable in many building constructions. It possesses, however, slight tensile strength, so that when subjected to very heavy loads the concrete will be forced apart laterally, and thus fracture the column.

In my Patent No. 764,883, July 12, 1904, I have described and claimed a column construction wherein the fracturing due to the lateral spreading of the concrete is overcome, this being accomplished by surrounding the main body of the concrete with a series of flat metallic bands which will prevent the concrete from spreading, and consequently from fracturing.

The present invention is an improvement on the column described in my aforesaid patent, one object being to increase the stability of the column by the use of vertical reinforcing members having a cross-section in which the metal is so distributed that the major portion thereof will be as far removed as possible from the center of the column, thus increasing the radius of gyration.

A further object of the invention is to provide means on the vertical members, whether of the character above described or otherwise, for holding them properly spaced from the casing, so that said members will be uniformly distributed in the concrete and be entirely embedded therein.

A further object is to provide improved means for holding the transverse bands against either downward or upward movement.

To these ends the invention consists in details of construction and arrangement hereinafter described and claimed.

In the accompanying drawings, Figure 1 is a vertical section through a column constructed according to my invention. Fig. 2 is a transverse section thereof. Figs. 3 and 4 are similar views showing modifications. Figs. 5, 6, and 7 are perspective views showing different manners for holding the bands against movement. Fig. 8 is a vertical section of another modification, and Fig. 9 is a horizontal detail section of still another modification.

In the drawings the concrete is shown at 1, and the vertical reinforcing members at 2. The latter may be variously arranged and located, depending upon the size and shape of the column. They will be of a cross-section, having the metal so distributed that the major portion thereof will be as far out from the center of the column as possible, so as to get the greatest radius of gyration and correspondingly increasing the stability of the column. The most advantageous cross-section to secure this result is a flat rectangular bar, strip, or band, such as shown at 2^a, Fig. 4. Preferably, however, these reinforcing members will be slightly stiffened by providing them with one or more inwardly-projecting flanges, either by using a channel-section, as shown at 2^b, Fig. 3, or a modified angle or T-section, the latter being shown at 2^c, Figs. 1 and 2. The inwardly-projecting flange or flanges of the angle, channel, or T sections greatly stiffen these reinforcing members. The metal nevertheless is so distributed that the major portion thereof is in the web of the channel or in the head of the T-bar, and as these are directed outwardly the radius of gyration is correspondingly large. In my design these vertical members are not intended to act as compression members, although they probably do so to some extent, but they act as tension members to prevent the flexing of the column. They also serve as means for supporting bands 6, which extend transversely of the column and envelop the major portion of the concrete body, these bands serving to hold the concrete against fracturing laterally, and thereby developing the greatest compressive strength of said concrete. The bands 6 therefore will preferably be flat and arranged with their flat

faces vertical; but they may be of other cross-section. They will be located comparatively closely together, so as to confine the major portion of the body of the concrete. These bands will have their ends united to form continuous bands in any suitable way, either in the manner shown in my patent aforesaid, or as illustrated in my application filed October 22, 1904, Serial No. 229,635, or by riveting the ends of the bands together, as shown in the drawings, or any other suitable way. One feature of the present invention consists in the manner of securing these bands to the vertical members, so as to prevent their movement vertically. Preferably this connection will be so arranged that the bands can neither rise nor fall, thus preventing them from becoming spaced apart irregularly or from assuming a diagonal position.

As shown in Figs. 1, 2, and 5, the vertical members have punched out from their opposite edges the tongues 8, which are arranged diagonally and engage the two edges of the bands and hold the same securely in place and against either falling or rising. The diagonal arrangement of these tongues provides for the easy insertion of both edges of the bands underneath said tongues.

In Fig. 6 there is only one tongue 19, whose upper end is bent across the top of the band to hold it from rising.

In Fig. 7 the bands are shown held in place by means of a staple 10 or the like, embracing the band and having its ends projecting through openings in the vertical member and upset or bent on the back. If desired, two such staples may be used, as indicated in the dotted lines.

In Fig. 8 the staple 11 is located on the rear of the vertical member and has its ends 12 projecting through openings in the vertical members and bent over the front face of the band.

In Fig. 9 a simple rivet 13 is shown for securing the band to the vertical member. This rivet may be one of the rivets which secures the ends of the band together.

Another feature of the invention consists in means for holding the vertical reinforcing members a proper distance away from the casing 14, so that said members will be uniformly distributed and entirely embedded in the concrete. The means for so holding these vertical members consists of projecting portions 15 on the vertical members themselves, which contact with the casing. These projecting portions preferably will be portions punched out of the reinforcing members and bent at an angle thereto to contact with the casing.

The metallic members of the column will be built up in the manner described and then inclosed in the casing and the concrete and cement filled into the same, thus entirely enveloping and embedding the metallic members. The bands 6 envelop the major portion of the body of the concrete, thus holding the same against lateral fracture, and consequently enabling the same to carry very heavy loads. The vertical reinforcing members act as tension members to resist flexing of the column. These vertical members have the major portion of their metal removed the greatest possible distance from the center of the column, thus greatly increasing the radius of gyration and giving the maximum stability to the column for the amount of metal in the vertical members. The bands are connected to the vertical members in such a manner that they will be held absolutely in place even though the workmen should use the bands as a ladder to climb up and down, as they frequently do in constructing the columns. Said bands in the completed column will be in a true horizontal position, thus giving them the maximum efficiency. The entire metallic structure will be uniformly distributed in the concrete by reason of the projecting portions 15, which contact with the casing. The resultant column possesses a very high degree of strength.

What I claim is—

1. A column or the like, comprising a series of metallic members extending vertically of the column, a series of metallic bands running transversely thereof and enveloping the main body of concrete, projections on said vertical members for holding the bands fixedly in place transversely to the axis of the column, and concrete or the like enveloping and embedding said bands and vertical members.

2. A column or the like, comprising a series of metallic members extending vertically of the column, a series of metallic bands running transversely thereof and enveloping the main body of concrete, said vertical members having projecting portions engaging the bands and holding the same fixedly in place transversely to the axis of the column, and concrete or the like enveloping and embedding said bands.

3. A column or the like, comprising a series of metallic members extending vertically of the column, a series of bands running transversely thereof and enveloping the main body of concrete, said vertical members having openings punched in their bodies, means projecting through said openings engaging said bands and holding the same fixedly in place transversely to the axis of the column, and concrete or the like enveloping and embedding said bands.

4. A column or the like, comprising a series of metallic members extending vertically of the column, a series of metallic bands running transversely thereof and enveloping the main body of concrete, staples having their ends projecting through openings in said ver-

tical members, said staples engaging said bands and holding the same fixedly in place transversely to the axis of the column, and concrete or the like enveloping and embedding said bands and vertical members.

5. A column or the like, comprising a series of metallic members extending vertically of the column, a series of metallic bands running transversely thereof and enveloping the main body of concrete, staples having their ends projecting through openings in said vertical members and bent over the front face of said bands and holding the same fixedly in place transversely to the axis of the column, and concrete or the like enveloping and embedding said bands and vertical members.

6. A column or the like comprising a series of metallic members extending longitudinally of the column, said members being provided with broad thin webs and arranged with said webs toward the outer face of the column, a series of bands connected to said vertical members and extending transversely of the column and enveloping the main body of concrete, and concrete or the like enveloping and embedding said metallic members.

7. A column or the like, comprising a series of matallic members extending longitudinally of the column, said members being provided with broad webs arranged toward the outer face of the column and with an inwardly-projecting flange or flanges, a series of metallic bands extending transversely of the column and connected to said vertical members and enveloping the main body of concrete, and concrete or the like enveloping and embedding said metallic members.

8. A column or the like, comprising a series of metallic members extending longitudinally of the column, said members having the major portion of the metal on the sides facing the outer surface of the column and being provided with projecting portions for contacting with the casing, and concrete or the like enveloping and embedding said metallic members.

9. A column or the like, comprising a series of vertical metallic members provided with projecting portions for contacting with the casing, a series of bands extending transversely of the column and engaging said vertical members, and concrete or the like enveloping and embedding said metallic members.

10. A column or the like, comprising a series of metallic members extending longitudinally of the column and having portions thereof punched out and bent at an angle to contact with the casing, and concrete or the like enveloping and embedding said metallic members.

11. A column or the like, comprising a series of metallic members extending longitudinally of the column and having portions of their bodies punched out and bent at an angle to contact with the casing, a series of bands extending transversely of the columns and engaging said longitudinal members, and concrete or the like enveloping and embedding said metallic members.

In testimony whereof I, the said ROBERT A. CUMMINGS, have hereunto set my hand.

ROBERT A. CUMMINGS.

Witnesses:
F. W. WINTER,
ROBERT C. TOTTEN.

R. A. CUMMINGS.

CONCRETE COLUMN AND THE LIKE.

APPLICATION FILED OCT. 22, 1904.

FIG. 1

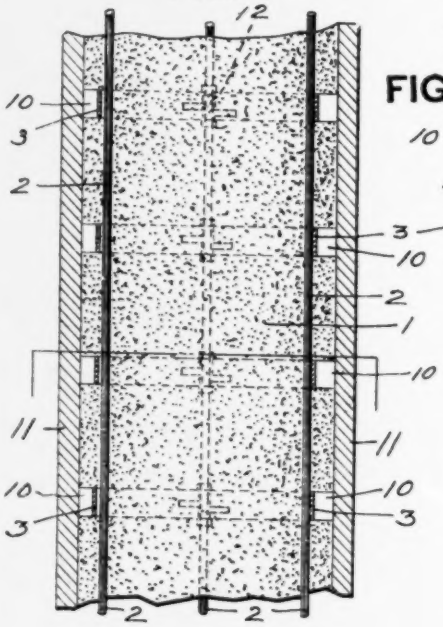


FIG. 2

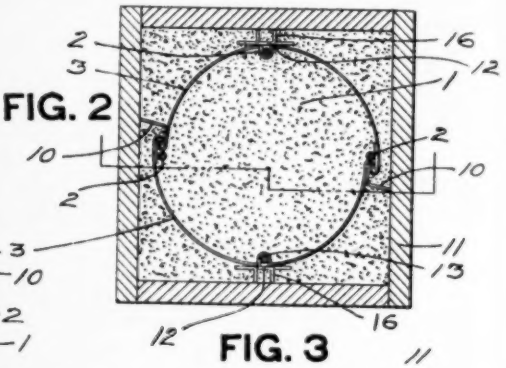


FIG. 3

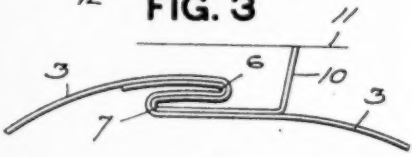


FIG. 4

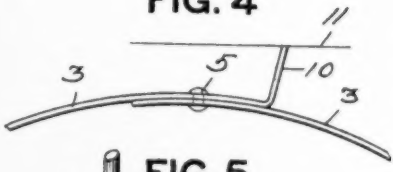


FIG. 8

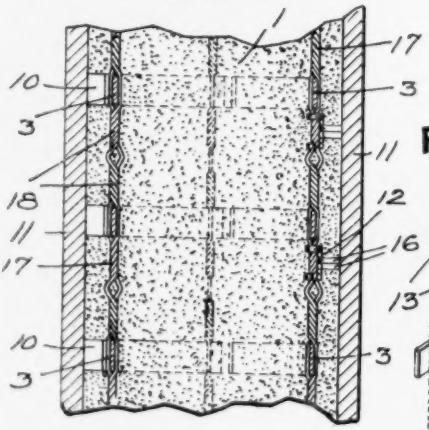


FIG. 5

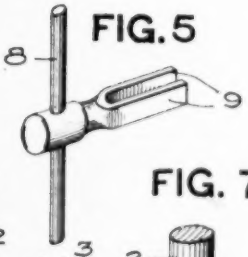


FIG. 6

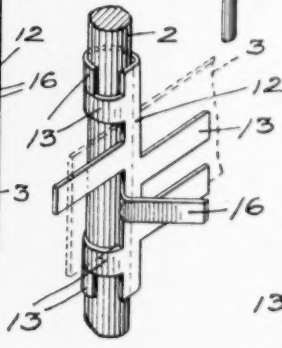
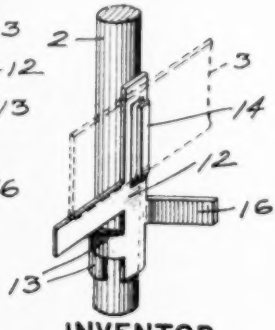


FIG. 7



WITNESSES.

J. R. Keller

Robt C Totten

INVENTOR.

Robert A Cummings

By Kay Totten & Winter

attorneys

UNITED STATES PATENT OFFICE.

ROBERT A. CUMMINGS, OF BEAVER, PENNSYLVANIA.

CONCRETE COLUMN AND THE LIKE.

No. 828,931. Specification of Letters Patent. Patented Aug. 21, 1906.

Application filed October 22, 1904. Serial No. 229,635.

To all whom it may concern:

Be it known that I, ROBERT A. CUMMINGS, a resident of Beaver, in the county of Beaver and State of Pennsylvania, have invented a new and useful Improvement in Concrete Columns and the Like; and I do hereby declare the following to be a full, clear, and exact description thereof.

My invention relates to concrete columns, piles, struts, and the like used in bridges, viaducts, docks, fireproof buildings, and other structures.

The object of my invention is to provide a column, pile, or strut which is composed mainly of cement or concrete and which will carry a very heavy load.

Concrete or cement possesses great compressive strength when properly constructed and supported, and it is not affected by fire, water, or other elements. For these reasons it is highly desirable in many building constructions. It possesses, however, slight tensile strength, so that when subjected to very heavy loads the concrete will be forced apart laterally, and thus fracture the column.

In my Patent No. 764,883, July 12, 1904, I have described a column construction wherein the fracturing due to the lateral spreading of the concrete is overcome, this being accomplished by surrounding the main body of the concrete with a series of flat metallic bands, which will prevent the concrete from spreading, and consequently from fracturing.

The present invention is an improvement on the column described in my aforesaid patent, the object being to simplify the construction of the bands and also of the longitudinal rods and to provide improved means which can be applied at the place of building the column for uniting the ends of the strips to form a continuous band and to hold the metallic parts in proper position with reference to the casing and also to provide means for holding the bands from falling down.

To these ends the invention consists in details of construction and arrangement hereinafter described and claimed.

In the accompanying drawings, Figure 1 is a vertical section through a column constructed according to my invention. Fig. 2 is a horizontal section therethrough. Fig. 3 shows the preferred manner of uniting the ends of the strips to form continuous bands. Fig. 4 shows a modification thereof. Fig. 5 is a view of a suitable tool for forming the joint shown in Fig. 3. Fig. 6 is a perspective view of the clip for holding the bands from falling down. Fig. 7 is a similar view showing a modification, and Fig. 8 is a vertical section showing a modified form of column.

In the drawings the concrete is shown at 1 and the vertical rods or reinforcing members at 2. The latter may be of various forms, either round or flat, and may be variously located, depending upon the size and shape of the column. In Fig. 2 four rods are shown located substantially ninety degrees apart and near the side faces of the column, but so that they are entirely embedded or enveloped by the concrete, and thus protected from the elements.

At suitable intervals in the column are embedded strips or bands 3 of metal of suitable size and width, so as to prevent the concrete from spreading laterally. These strips have their ends connected, so as to form continuous bands which encircle the main body of the concrete composing the column. Each band may be composed of a single continuous strip having its two ends united, or each band may be made up of a plurality of strips having their meeting ends united, and thus forming the continuous band. In the drawings I have shown each band composed of two strips with the ends thereof united; but I wish it understood that I do not exclude a construction wherein the band is made of a single or of more than two united strips. The ends of these bands will be united in any suitable way—such, for instance, as by means of the rivets 5, (shown in Fig. 4,) but preferably by having the ends overlapped and then bent into reverse curved form, such as shown in Fig. 3, so as to form, in effect, two hooks 6 and 7. This bending of the strips can be conveniently accomplished at the place of building the column by means of a suitable tool, such as shown in Fig. 5, the same having a handle 8 and a pair of fingers or prongs 9, between which the overlapped strips will be placed, and then by giving said tool a half-turn the strips will be bent into the reflex form shown in Fig. 3, thus forming a secure and tight interlocking connection. This joint may be hammered flat, if desired. The extreme end of the outermost lap will in all cases be bent outwardly, as at 10, thus forming a spacing-piece for contacting with the mold or casing 11 and holding the metal portions a proper distance away from said casing,

so that the concrete when filled around the same will thoroughly conceal and embed all portions of the metallic structure.

The bands 3 encircle the longitudinal rods or members 2 and preferably are of general circular form, as shown in Fig. 2. When only a single longitudinal rod 2 is provided at each place, as in Figs. 1 and 2, means is provided to keep the bands from falling down and to hold the same in place until the concrete is built around the same. For this purpose I use suitable clips for attaching the same to the rods. These clips may be of various forms; but I prefer to use a sheet-metal member having a body 12 with tongues or fingers projecting from the two edges thereof. Some of these tongues or fingers 13 will be bent around the longitudinal members 2, as shown in Figs. 6 and 7, to secure the clips firmly to said members. The bands 3 will either be inserted between the body of the clip 12 and rod 2, as shown in Fig. 6, and will be prevented by the encircling fingers 13 from dropping down or else the band will be held up by means of a tongue 14, stamped out from the body of the clip, as shown in Fig. 7, or by a combination of both. Others of the lateral-projecting fingers of the clips will be turned outwardly, as shown at 16, so as to contact with the casing or mold 11 and hold the metallic members a proper distance away therefrom. These clips need not be used on all of the longitudinal bars unless so desired, and if used on the longitudinal bars at the points where the ends of the bands meet and where the bands have the outwardly-turned fingers 10 then the fingers 16 on the clips need not be turned outwardly to contact with the casing; but at other points where there is no outturned end on the band these clips will have some of their fingers turned outwardly to serve as the spacing members to contact with the casing.

In Fig. 8 is shown a modification wherein the bands 3 are held between two rods 17, one inside the bands and the other outside the same, said rods being twisted together intermediate the adjacent bands, as at 18, as may be conveniently done by inserting a bar between said rods and turning the same. In this modification the clips 12 can be dispensed with except at places where the fingers 16 are necessary to hold the longitudinal members away from the casing.

After the metal structure has been built up in the manner specified the concrete will be filled into the casing and around the metal members, entirely enveloping and embedding the longitudinal rods, the bands, and the clips. The projecting ends 10 of the bands, together with the projecting fingers 16 of the clips, hold the metallic parts in proper position relative to the casing, and the clips 12 or twisted rods of Fig. 8 hold the bands from sliding down. As a result the column has the metallic members uniformly and properly distributed in the concrete, and all portions of the metallic parts are completely enveloped by the concrete, so that said metallic parts cannot be affected by the elements.

The column described is exceedingly strong, this resulting in part from the uniform distribution of the metallic members therein, but mostly from the fact that the bands prevent the concrete from spreading laterally, and thus fracturing. The bands can be ordinary sheet-metal bands of the desired width and of any desired lengths. Indeed, odd lengths can be used at the place of construction by merely bending their ends to form the interlocking joint shown in Fig. 3. The clips are thin sheet-metal members stamped into form with the projecting fingers on their edges. These fingers can be easily bent at the place of construction, so as to attach the clips to the longitudinal rods and to space the metallic structure from the casing. The bands and clips are cheap and easy of application.

What I claim is—

1. A column, pile or the like, comprising a series of metallic strips or bands running transversely of the column and having their ends united to form continuous bands and having an extreme end portion bent outwardly to form a spacing member for contacting with the mold or casing, and concrete or the like enveloping and embedding said bands.

2. A column, pile or the like, comprising a series of rods or strips extending longitudinally of the column, a series of metallic strips or bands running transversely of the column and having their ends united to form continuous bands and having extreme end portions bent outwardly to form spacing members for contacting with the mold or casing, and concrete or the like enveloping and embedding said bands and rods.

3. A column, pile or the like, comprising a series of metallic strips provided with interlocking end portions and united thereby to form continuous bands running transversely of the column and having extreme end portions bent outwardly to form a spacing member for contacting with the mold or casing, and concrete or the like enveloping and embedding said bands.

4. A column, pile or the like, comprising a series of rods or strips extending longitudinally of the column, a series of metallic strips provided with interlocking end portions and united thereby to form continuous bands and running transversely of the column and having extreme end portions bent outwardly to form spacing members for contacting with the mold or casing, and concrete or the like enveloping and embedding said bands and rods.

5. A column, pile or the like, comprising a series of metallic strips having their ends bent

into hooks and united thereby to form continuous bands and running transversely of the column, and concrete or the like enveloping and embedding said bands.

6. A column, pile or the like, comprising a series of metallic strips having their ends bent into hooks and united thereby to form continuous bands and having portions bent outwardly to form spacing members for contacting with the mold or casing, and concrete or the like enveloping and embedding said bands.

7. A column, pile or the like, comprising a series of flat metallic strips having their ends lapped and bent into reverse curves to form double hooks and united thereby to form continuous bands, and concrete or the like embedding and enveloping said bands.

8. A column, pile or the like, comprising a series of flat metallic strips having their ends lapped and bent into reverse curves to form double hooks and united thereby to form continuous bands and having the extreme end of the outer lap bent outwardly to form a spacing member for contacting with the mold or casing, and concrete or the like enveloping and embedding said bands.

9. A column, pile or the like, comprising a series of rods extending longitudinally of the column, a series of bands running transversely of the column, clips for securing the bands to the rods, said clips having portions projecting outwardly to contact with the mold or casing, and concrete or the like embedding and enveloping said bands and rods.

10. A column, pile or the like, comprising a series of rods extending longitudinally of the column, a series of bands running transversely of the column, clips comprising metallic members provided with projecting fingers some of which are bent in one direction around the rods and others of which are bent outwardly to contact with the casing or mold, and concrete or the like enveloping and embedding said rods and bands.

11. A column, pile or the like, comprising a series of rods extending longitudinally of the column, a series of bands running transversely of the column, clips comprising metallic members provided with projecting fingers some of which are bent in one direction around the rods and others of which are bent outwardly to contact with the casing or mold, said clips having means for engaging the bands, and concrete or the like enveloping and embedding said rods and bands.

In testimony whereof I, the said ROBERT A. CUMMINGS, have hereunto set my hand.

ROBERT A. CUMMINGS.

Witnesses:

ROBERT C. TOTTEN,

G. C. RAYMOND.

No. 857,821. PATENTED JUNE 25, 1907.

E. McCLURE.

BUILDING CONSTRUCTION.

APPLICATION FILED DEC. 17, 1906.

Fig. 1.

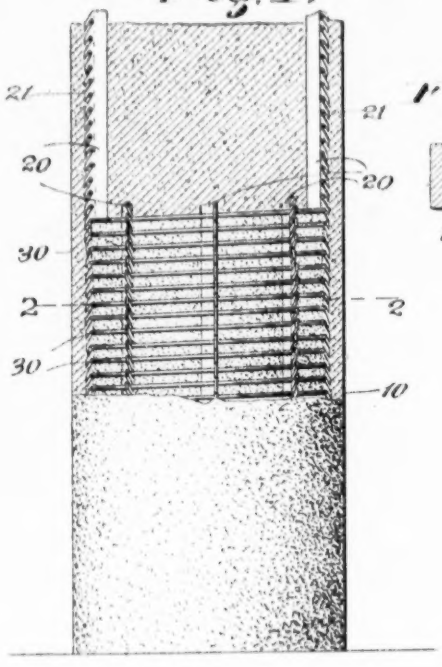


Fig. 4.

Fig. 3.

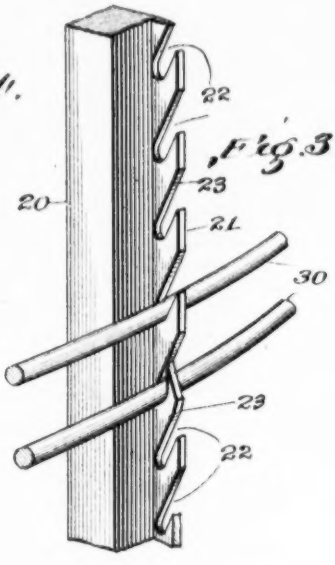


Fig. 5.

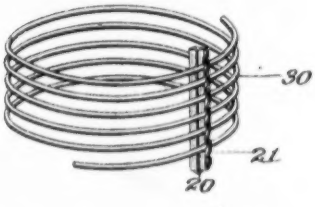


Fig. 2.

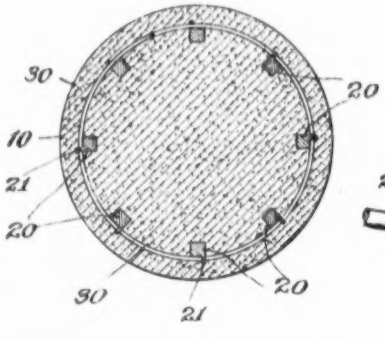


Fig. 8.

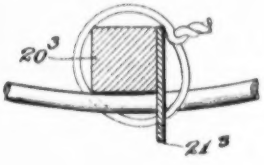


Fig. 6.

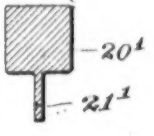


Fig. 7.

Witnesses:
Wm. P. Bond
Leone S. Russell

Inventor:
Edward McClure,
by Charles C. Shervey
his Atty.

UNITED STATES PATENT OFFICE

EDWARD McCLURE, OF CHICAGO, ILLINOIS, ASSIGNOR OF ONE-HALF TO FRANKLIN P. SMITH, OF CHICAGO, ILLINOIS.

BUILDING CONSTRUCTION.

No. 857,821. Specification of Letters Patent. Patented June 25, 1907.

Application filed December 17, 1906. Serial No. 348,119.

To all whom it may concern:

Be it known that I, EDWARD McCLURE, a citizen of the United States, a resident of Chicago, in the county of Cook and State of Illinois, have invented certain new and useful Improvements in Building Construction, of which the following is a full, clear, and exact description.

My invention relates to certain new and useful improvements in building construction and more particularly to improvements in the columns which form the upright supporting members, of the building.

The object of the invention is to simplify constructions of this class, to increase the strength thereof, to provide a rigid and practically inflexible binder for the concrete and to otherwise improve the same.

To such end the invention relates to certain novel features of construction and arrangement, a description of which will be found in the following specification and the essential features of which will be more definitely pointed out in the appended claims.

The invention is clearly illustrated in the accompanying drawing in which

Figure 1 is a view partly in side elevation and partly in section illustrating the preferred form of my invention. Fig. 2 is a horizontal section taken in the line 2—2 Fig. 1. Fig. 3 is a fragmental perspective view of one of the upright members, and binder wire that form the main frame or skeleton of the column. Fig. 4 is a horizontal cross section through one of the uprights. Fig. 5 is a perspective view of a fragment of the binder wire and one upright, and Figs. 6, 7 and 8 are horizontal cross sections of modified forms of uprights.

In Figs. 1 to 5, inclusive, 10 represents a column constructed in accordance with the preferred form of my invention. As shown the frame work of the column contains a number of circumferentially disposed bars or uprights 20, of any suitable cross section, and preferably of rolled steel bars. The size of the bars, that is to say the area of their cross section, and their number depend upon the size of the column and the load to be carried, and the ones shown in Figs. 3 and 4 are approximately half size and suitable for a column of say, from 18 to 30 inches. These bars are connected by a coil of wire 30, which is wound around the bars and suitably spaced apart and connected thereto by a serrated or toothed fin or web 21, which extends out from the main part of the bar or rod as clearly shown in Figs. 3 and 4. This fin or web 21, is quite thin as compared with the main body of the bar or rod 20, and the notches or spaces 22, between the teeth 23 preferably extend at an acute angle with respect to the bar or rod. The alternate bars or rods 20, are upended or reversed, to make the teeth and notches extend downward and in a direction opposite to that in which the notches in the other bars extend, the effect being to secure the wire to the bars or rods without any further fastening medium. In practice, however, it is found desirable to clench the ends of some of the teeth down upon the wire and this is done with every fifth or sixth tooth. By thus clenching a few of the teeth the wires and uprights are tied together and no twisting is possible of the frame thus formed. In constructing columns of this class it is important that the main body of the uprights should not be weakened in any manner, inasmuch as its strength will thereby be greatly impaired. Various attempts have been made to space the wires upon the uprights and to tie them thereto, as for instance, they have been wired thereto, but with a construction of this kind the frame when complete, may be twisted around and it is practically impossible to make a perfectly rigid frame, which is obviously necessary in a device of this class. For very light work, thin, notched strips have been used but this is impractical for heavy work, and if rods of large diameter are used with notches and teeth extending the full width of their faces, a great waste of material is occasioned and the bar is weakened by punching out the slots between the teeth. Furthermore the clenching down of teeth of this size becomes a difficult matter requiring extra labor and time. By constructing the rod or bar of the proper cross section to be the most effective for the purpose intended, and providing it with a serrated fin or web for the attachment of the wire, all of the undesirable and impracticable features are avoided and means are provided whereby the rods and wire may be firmly united to make a more rigid frame work, with less amount of metal, and labor in its construction. To complete the column the frame thus formed is filled with concrete 30

and the outer surface covered with two or three inches of concrete, thus completely embedding the frame in the concrete. The concrete surrounds the bars on all of their sides and fills in between the teeth of the fins and between the turns of the coil of wire, so that the frame and concrete are firmly united. A column thus constructed has practically the same carrying capacity as the ordinary steel column occupying the same amount of area in cross section and is less destructible in fire than the unprotected steel columns.

In Fig. 6 the fin or web 21^1 is shown as placed in the center of one of the sides of the bar 20^1, and in Fig. 7 the bar 20^2 is oblong in cross section with the fin or web 21^2 extending out from one of its corners. In Fig. 8 the fin or web is shown as composed of a separate strip of metal 21^3 wired to the main bar 20^3. Other alterations and modifications of the device are possible and I do not therefore desire to limit myself to the specific forms shown and described except as particularly pointed out in the appended claims.

I claim as new and desire to secure by Letters Patent.

1. In a concrete column construction, the combination of one or more upright bars or rods and a spiral encircling band extending throughout the entire length of the column, each bar or rod having a thin toothed longitudinally extending web adapted to form a connecting medium between the encircling band and the bars or rods.

2. In a concrete column construction, the combination of a plurality of circumferentially disposed upright bars or rods, each having a thin toothed longitudinally extending fin or web, a spiral coil of wire wound upon the bars and extending throughout the entire length of the column, each turn of the wire being seated in the notches between the teeth of the fins, and a body of concrete in which the bars and wire are wholly embedded.

3. In a concrete column construction, the combination with a metal frame work, comprising upright bars or rods having thin longitudinally extending fins or webs that contain diagonally extending notches, and a spiral coil of wire wound upon said bars and extending throughout the entire length of the column, each turn of said wire resting in a notch in the fins or webs, of a body of concrete in which the frame work is wholly embedded.

4. In a concrete column construction, the combination of a plurality of upright bars or rods, each having a thin longitudinally extending toothed fin or web, the teeth extending diagonally with respect to the bar, and the teeth on the alternate bars extending upward, and on the others extending downward, a spiral coil of wire wound around the bars or rods and extending throughout the entire length of the column and seated in the spaces between the teeth, and a body of concrete in which the bars and wire are wholly embedded.

5. In a concrete column construction, the combination of a plurality of bars or rods, each having a longitudinally extending toothed web, a spiral coil of wire wound around the bars or rods and extending throughout the entire length of the column and seated in the spaces between the teeth, certain of which are clenched down upon the wire, and a body of concrete in which the bars and wire are wholly embedded.

In witness whereof I have executed the above application for Letters Patent of the United States, at Chicago, county of Cook and State of Illinois, this twelfth day of December, 1906.

EDWARD McCLURE.

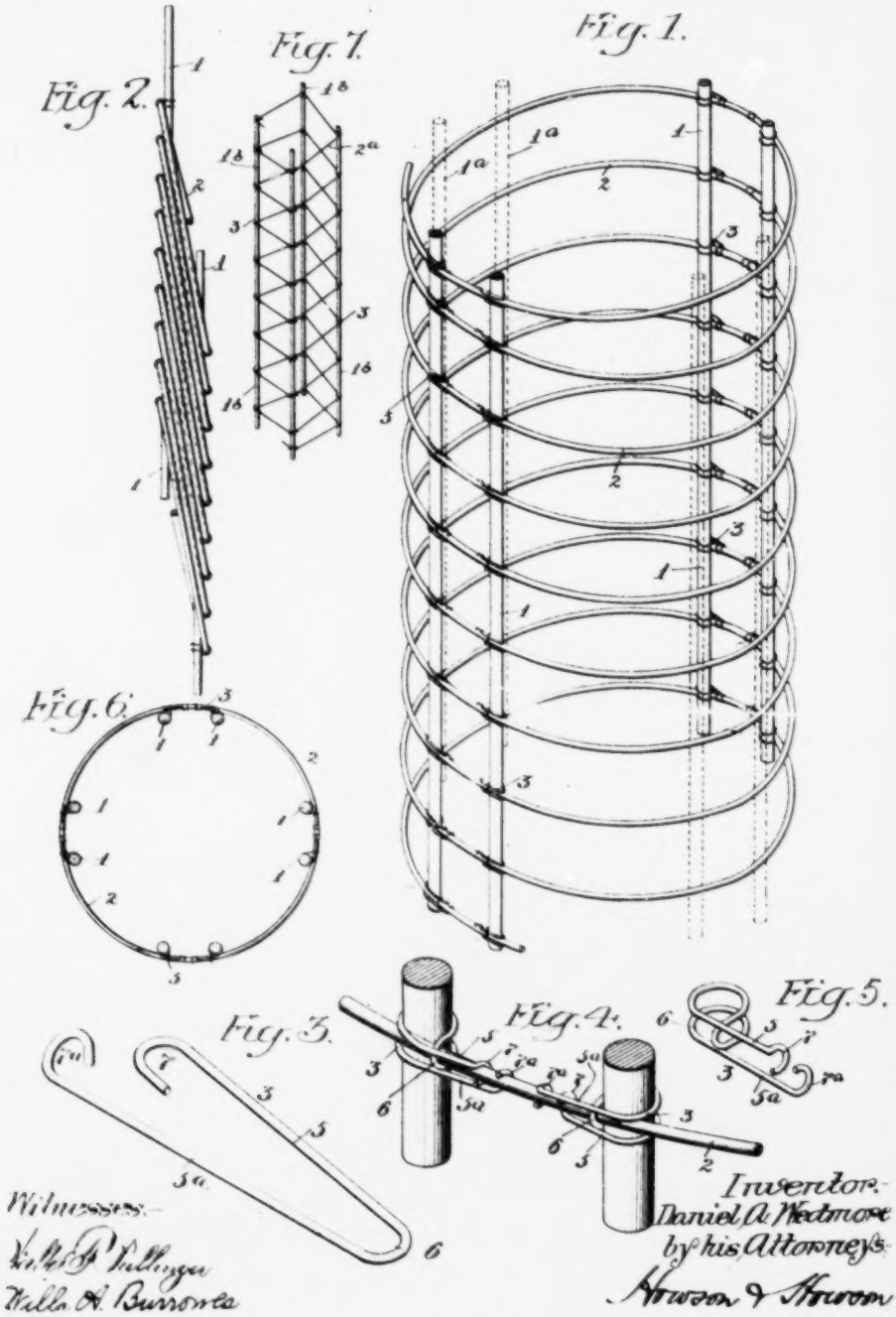
Witnesses:
R. R. BARNITT,
A. FRISBIE.

D. A. WEDMORE.

METALLIC REINFORCE FOR CONCRETE CONSTRUCTION.

APPLICATION FILED MAY 4, 1908.

918,715. Patented Apr. 20, 1909.



UNITED STATES PATENT OFFICE.

DANIEL A. WEDMORE, OF PHILADELPHIA, PENNSYLVANIA, ASSIGNOR TO PHILADELPHIA STEEL & WIRE CO., OF PHILADELPHIA, PENNSYLVANIA, A CORPORATION OF NEW JERSEY.

METALLIC REINFORCE FOR CONCRETE CONSTRUCTION.

No. 918,715. Specification of Letters Patent. Patented April 20, 1909.

Application filed May 4, 1908. Serial No. 430,834.

To all whom it may concern:

Be it known that I, DANIEL A. WEDMORE, a citizen of the United States, residing in Philadelphia, Pennsylvania, have invented certain Improvements in Metallic Reinforces for Concrete Construction, of which the following is a specification.

My invention relates to concrete construction in which metallic reinforcing means are employed; and the object of my invention is to provide a collapsible reinforce for column construction, capable of being assembled in a shop or factory for shipment to the job in a folded or collapsed condition and available to be set up in the position of use and, with the aid of the usual form or centering, receive the concrete and thus form the core and support of the complete column.

My invention is fully shown in the accompanying drawings, in which:

Figure 1, is a perspective view of collapsible reinforcing means for column construction showing the same set up, preparatory to placing the centering for receiving the concrete; the additional rods which are provided for the complete structure being indicated in dotted lines; Fig. 2, is a view of the reinforcement in the collapsed condition; Fig. 3, is a perspective view, full size, of the tie member prior to use; Fig. 4, is an enlarged perspective view of a pair of the vertical rods and the helical spacer for the same, showing the manner of securing the rods and spacer together; Fig. 5, is a perspective view of the tie member as bent in securing the parts together; Fig. 6, is a sectional plan view of the column reinforce, and Fig. 7, illustrates a form of structure rectangular in contour.

The present practice of reinforcing concrete structures is, of course, too well known to require explanation or detailed description. The common method of procedure in the reinforcing of posts or columns is to either build the reinforcing element on the job or to have the structure rigidly built in its final form and shipped to the place of use, there to receive the heavier reinforcing bars, or, in some instances carrying the same with them. In the use of reinforcing structures of this character, there are a number of difficulties, among which may be mentioned the excessive freight incident to the shipment of heavy structures, the built of the ready built structure, and in the case of the reinforcements erected on the job the time that must be consumed in fitting the elements of the same together. All of these objections are avoided by the use of the folding or collapsible structure forming the subject of my invention.

My present invention is directed particularly to reinforced columns. In a pending application I have illustrated one form of column substantially square and providing for the construction of a square column, made up of corner bars with independent horizontally disposed spacing members. My present invention, however, comprises a reinforcement consisting of a series of vertical reinforcing rods with a continuous spacing member of heavy wire or flat metal extending from the bottom to the top of the column and tied at intervals to pairs of oppositely disposed reinforcing bars. By disposing these bars in pairs relatively close together and providing a special form of tie member for securing them to the helical spacer, I provide a structure that can be readily collapsed as indicated in Fig. 2; the tie members forming hinge joints between said spacer and the vertical reinforcing rods.

In the drawings 1, 1, represent the reinforcing rods; 2, the helical spacer, and 3, the tie members connecting said spacer and rods. Although each hinge joint formed by the tying to ans is on the arc of a circle described by the helical spacer, yet such securing means are disposed so close together that in practice no difficulty is experienced in attempting to fold the structure on the joint thus formed.

The enlarged view, Fig. 3, shows the tying member before use, and Fig. 4, shows the manner of connecting the vertical reinforcing rods and the helical spacer by the use of the same. As shown in Fig. 3, this tying device has substantially paralleling runs 5 and 5^a connected by a bend 6 forming a continuous structure; said runs having at their free ends hooks 7 and 7^a which may lie in the same plane or at an angle to each other. This tie member is first applied to the helical spacing band or wire; the bend 6 of the same engaging it in the manner shown in Fig. 4; such bend being held close to the vertical reinforcing rod by a suitable tool, while the hooked portions of the substantially paral-

leling runs are caught around the wire forming the spacing means; one of said ends being shorter than the other. It will thus be seen that a hinge joint is provided by the tying means that will permit folding or collapsing of the structure to permit of its ready handling. When set upon the job, additional pairs of bars or rods such as indicated at 1^a in dotted lines are employed in connection with the structure and these may be secured to the helical wire or band forming the spacing means at various points. It is, of course, unnecessary to tie these additional bars at every run of the spacer, since the main bars employed in connection with the same when in its collapsible condition, are tied at every run, and such condition will insure the proper positioning of the spacing means.

In the form of structure shown in Fig. 7, the vertical rods or bars 1^b are disposed singly, in rectangular form, with a continuous spacer 2^a, the whole being capable of folding or collapsing in substantially the same manner as the structure shown in Fig. 1.

It is obvious, of course, that other forms of ties capable of performing the function desired may be employed instead of the specific device shown and described herewith, and hence my invention is not limited to the use of any specific form of tying means for securing the rods and spacer together.

I claim:

1. A collapsible reinforcement for concrete construction, comprising a series of longitudinal reinforcing bars or rods, a continuous spacing member connected to said rods, and means permitting movement of said members with respect to each other and securing the same together, said reinforcing bars or rods being disposed in pairs opposite each other and the rods of each pair being relatively close together.

2. A collapsible reinforcement for concrete construction, comprising pairs of longitudinal reinforcing bars or rods, a continuous spacing member connected to said rods, and tying means forming hinge joints connecting said rods and spacing member, said pairs of rods being disposed opposite each other and relatively close together.

3. A collapsible reinforcement for concrete column construction, comprising pairs of longitudinal reinforcing bars or rods, a continuous spacing member connected to said rods, and tying means encircling the rods and secured to the spacing member, said means connecting said bars and spacing member together but permitting movement of the same with respect to each other, said reinforcing bars or rods being disposed in pairs opposite each other and the rods of each pair being relatively close together.

4. The combination, in a reinforcement for concrete construction, of a series of longitudinal reinforcing rods or bars, a helically coiled wire forming spacing means for said bars, and tying means at the crossing points of said wire and bars, said means being so disposed as to form hinge joints permitting movement of said bars and wire with respect to each other to collapse the structure.

5. The combination, in a reinforcement for concrete column construction, of pairs of longitudinal reinforcing rods or bars, a helically coiled wire forming spacing means for said bars, and tying means at the crossing points of said wire and bars, said means being so disposed as to form horizontal hinge joints permitting movement of said bars and wire with respect to each other to collapse the structure.

6. The combination, in a reinforcement for concrete construction, of reinforcing rods or bars, a helically coiled spacing member, and tying means connecting said spacing member and the rods or bars, said tying means comprising a looped member having substantially paralleling runs with hooked ends, the loop of said member being adapted to engage the continuous spacing member while the hooked ends of the tie are arranged to pass around the rods or bars and engage the spacing members at points beyond the loop.

7. The combination, in a reinforcement for concrete column construction, of reinforcing rods or bars, a helically coiled spacing member, and tying means connecting said spacing member and the rods or bars, said tying means comprising a looped member having substantially paralleling runs with ends of unequal length terminating in hooks, the loop of said member being adapted to engage the continuous spacing member while the hooked ends of the tie are arranged to pass around the rod or bars and engage the spacing member at different points beyond the loop.

In testimony whereof, I have signed my name to this specification, in the presence of two subscribing witnesses.

DANIEL A. WEDMORE.

Witnesses:
E. P. WALLACE,
G. REDMOND.

E. McCLURE.

CONCRETE REINFORCEMENT.

APPLICATION FILED AUG. 8, 1910.

992,970. Patented May 23, 1911.

Fig. 1.

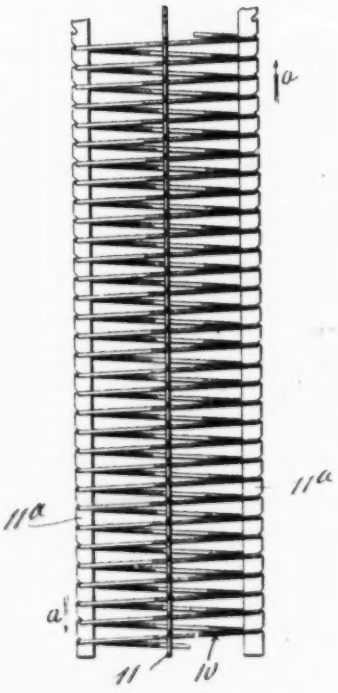


Fig. 5.

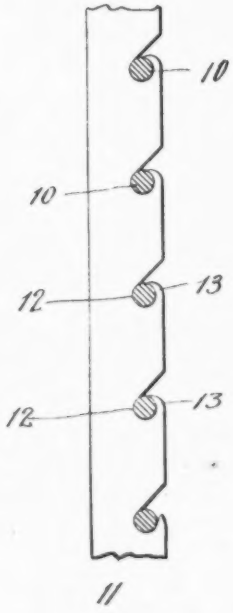


Fig. 3.

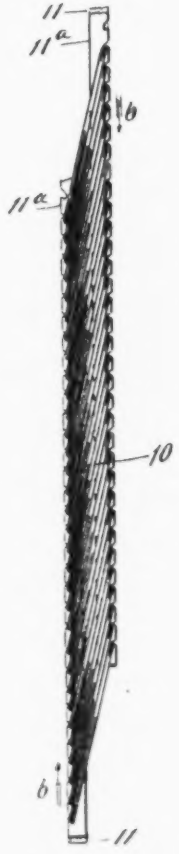


Fig. 2.

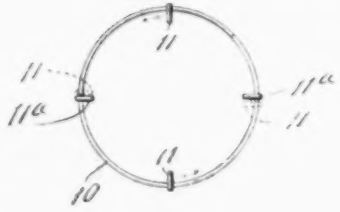
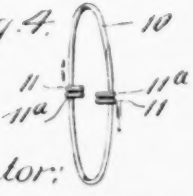


Fig. 4.



Witnesses:
Fannie F. Richards
Rebecca Rhoads-Billings

Inventor:
Edward McClure
by Charles J. Sherry
his Atty

UNITED STATES PATENT OFFICE.

EDWARD McCLURE, OF CHICAGO, ILLINOIS, ASSIGNOR OF ONE-HALF TO FRANKLIN P. SMITH, OF CHICAGO, ILLINOIS.

CONCRETE REINFORCEMENT.

992,970. Specification of Letters Patent. Patented May 23, 1911.

Application filed August 8, 1910. Serial No. 576,088.

To all whom it may concern:

Be it known that I, EDWARD McCLURE, a citizen of the United States, residing at Chicago, in the county of Cook and State of Illinois, have invented new and useful Improvements in Concrete Reinforcements, of which the following is a specification.

This invention relates to concrete reinforcements and more particularly to that class of reinforcements used in reinforced concrete columns for resisting the lateral or transverse stresses that occur therein.

The object of this invention is to provide a reinforcement unit of this class which may be collapsed into condensed form for transportation or storage, and which may be readily extended into operative condition for use in the column.

To such ends this invention consists in a reinforcement for resisting the lateral stresses in columns, and having spaced, encircling reinforcement members and one or more spacing members directly secured thereto in such manner that the whole may be collapsed upon itself into compact form or extended into operative condition.

The invention further consists in the several novel features of construction and arrangement set forth in the following specification and particularly pointed out in the claims.

The invention is clearly illustrated in the drawing furnished herewith, in which—

Figure 1 is a side elevation of a reinforcement embodying the preferred form of the invention and showing the same in its extended or operative position, Fig. 2 is an end view thereof, Fig. 3 is a side elevation of the reinforcement shown in Fig. 1, but illustrating the same in its collapsed condition, Fig. 4 is an end view of the reinforcement in its collapsed condition and Fig. 5 is a fragmental side view of a spacing member showing a number of the encircling members in cross section and secured upon said spacing member.

Referring to the drawings, which show an embodiment of the preferred form of the invention, an encircling reinforcement element 10, will be seen, which element is adapted to act as a reinforcement for reinforced concrete columns and arranged to resist the lateral or transverse stresses that occur therein. Said encircling reinforcement element may be made in various forms, and as shown comprises a spiral band, the coils or turns of which may be spaced apart to suit the particular conditions in any given case. Said spiral band may be made of round rod or wire of proper diameter, but it is obvious that various other forms of strain resisting elements may be used. For maintaining the coils of said encircling reinforcement element in spaced relation to each other, spacing members 11, 11^a, are provided, which as shown may have seats 12, adapted to receive the coils of the encircling reinforcement element 10. It is preferred to secure said encircling members in the seats 12, and to accomplish this, overhanging portions are provided upon the spacing member, which as shown may comprise tongues 13, that may be clenched over the portions of the encircling members confined in the seats.

Many forms of spacing members are well known to those skilled in the art, and may be substituted for the one shown in the drawings without departing from the spirit of this invention.

It is preferred to employ two or more spacing members, two of which 11^a, are arranged diametrically opposite to each other as shown in Figs. 1 and 2, which spacing members act not only to space the several coils or turns of the encircling reinforcement elements, but to provide means whereby said encircling reinforcement may be moved into condensed condition. When the particular form of spacing member shown in the drawing is used, the tongues 13 may be clenched down upon the encircling members sufficiently to retain the same in their seats, but not firmly enough to prevent the several coils of the encircling reinforcements from turning in the seats. When more than two spacing members are used in the device, said extra spacing member or members should be loosely secured upon the encircling members so that they may be slid around upon the encircling members until brought adjacent to the stationary spacing members 11^a. When only two spacing members are used, it is evident that the reinforcement may be collapsed into condensed form by simply forcing the spacing members 11^a, in opposite directions as indicated by the arrows *a*, in Fig. 1, until the parts are brought into the collapsed condition seen in Fig. 3. In this condition the parts are brought into the compact form and the parts may be

easily handled and will occupy considerably less space than the parts would in their extended form. To bring said condensed reinforcement into operative position, the bars 11ª, are moved in opposite directions, as indicated by the arrows *b*, in Fig. 3, until the parts assume the original position shown in Fig. 1. When more than two spacing members are employed in the device, the other spacing members are first shifted around until they occupy the position shown in dotted lines in Fig. 2; that is to say, they are brought close to the stationary spacing members 11ª, so that the seats thereof will be in register with each other, whereby the seats will act as fulcrums or bearings, in which the several coils of the encircling element may turn. This form may then be condensed by simply shifting the groups of spacing members longitudinally in opposite directions as before, and the reinforcement may be extended into operative form by re-shifting the spacing members and subsequently moving the intermediate spacing members into such positions that all will be symmetrically disposed with respect to each other. After this has been done, the tongues of the spacing members may be clenched down if desired, to more rigidly fasten the encircling members to the spacing members.

The advantages of this device are readily apparent. The condensed structure can be handled easier, occupies less room in storage, and reduces the cost of transportation on account of the reduction of space occupied.

While I have shown and described the preferred form of the invention, it is to be understood that various modifications and arrangements of the several parts may be made without departing from the spirit of the invention, and I do not desire, therefore, to limit myself to the exact construction shown and described, except as may be necessitated by the state of the art.

I claim as new and desire to secure by Letters Patent:

1. A reinforcement for reinforced concrete columns, comprising an encircling reinforcement element having a plurality of spaced encircling members, and spacing bars for said encircling reinforcement element having notches in which the reinforcement members of the reinforcement element are rotatively secured and having overhanging portions for loosely holding said encircling members in the notches, whereby said spacing members may be shifted longitudinally of themselves to bring said encircling reinforcement into collapsed form.

2. A reinforcement for reinforced concrete columns, comprising an encircling reinforcement element having a plurality of encircling members, a pair of diametrically opposed spacing members having seats formed therein for receiving and spacing apart said encircling members and overhanging portions for loosely retaining said encircling members in their seats, said seats acting as bearings in which the encircling members may turn, whereby said spacing members may be shifted relative to each other to collapse the reinforcement into compact form.

3. A reinforcement for reinforced concrete columns, comprising a spiral reinforcement, a pair of diametrically opposed spacing members having seats formed therein at definite, fixed, points thereon for loosely receiving and spacing the several coils of the spiral reinforcement member, said spacing members being adapted to be shifted relative to each other to collapse the reinforcement into compact form.

4 A reinforcement for reinforced concrete columns, comprising a spiral reinforcement member formed of a round rod, a pair of diametrically opposed spacing members having notches formed therein for receiving and spacing apart the several coils of the spiral reinforcement member and overhanging tongues arranged to loosely secure said coils upon the spacing members, said spacing members being adapted to be shifted relative to each other to collapse the spiral reinforcement into compact form.

5. A concrete column reinforcement unit, comprising a spiral band and spacing bars for spacing the coils apart, the several coils of the band being rotatively secured in seats formed in said spacing bars, and being capable of movement into collapsed form while connected with the spacing members.

In witness whereof I have hereunto subscribed my name at Chicago, Cook county, Illinois, this 1st day of August 1910.

EDWARD McCLURE.

Witnesses:
FANNIE F. RICHARDS,
CHARLES O. SHERVEY.

W. H. BURK.

SPACING DEVICE FOR REINFORCING RODS IN CONCRETE STRUCTURES.

APPLICATION FILED JAN. 25, 1911

1,016,319.

Patented Feb. 6, 1912.

2 SHEETS—SHEET 1

Fig. 1.

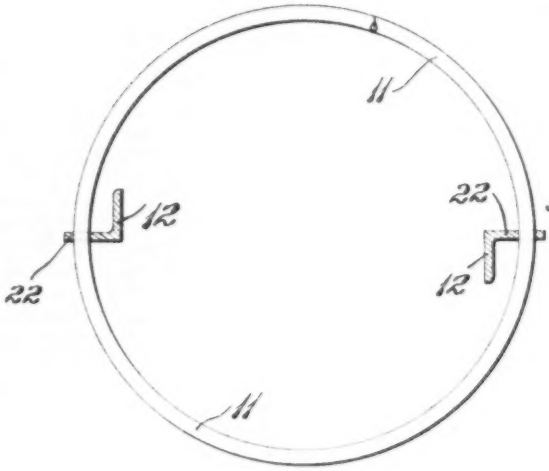


Fig. 3.

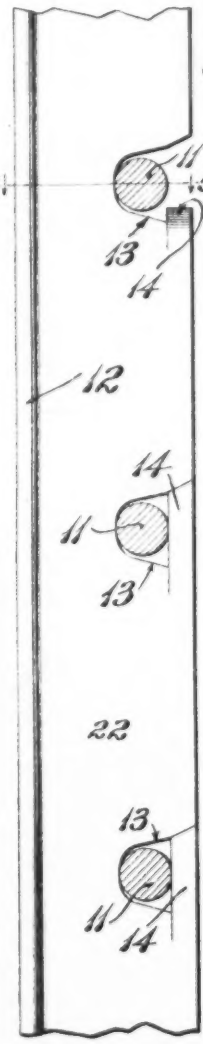


Fig. 4.

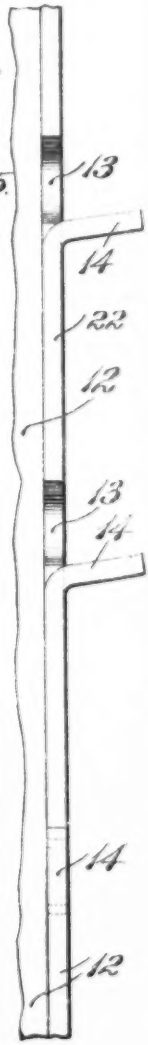
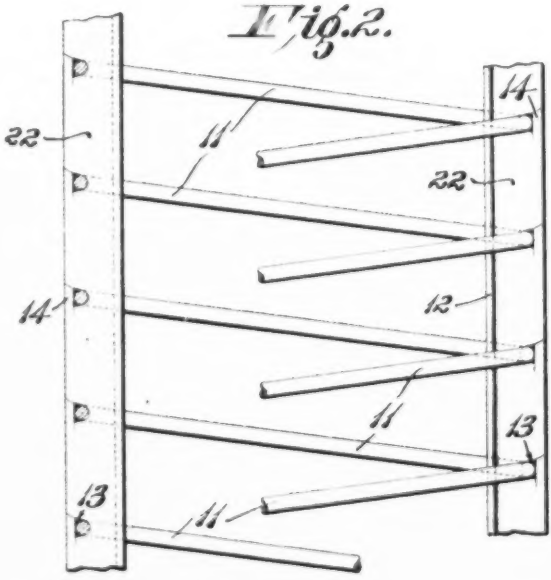


Fig. 2.

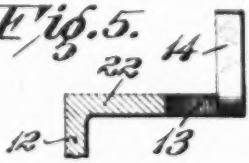


Witnesses:

Edgar F. Farrell

Alexander

Fig. 5.



Inventor:

William H. Burk,

By Cornet Cornet

attys.

W. H. BURK.

SPACING DEVICE FOR REINFORCING RODS IN CONCRETE STRUCTURES.

APPLICATION FILED JAN. 25, 1911.

1,016,319. Patented Feb. 6, 1912.

2 SHEETS—SHEET 2.

Fig. 6.

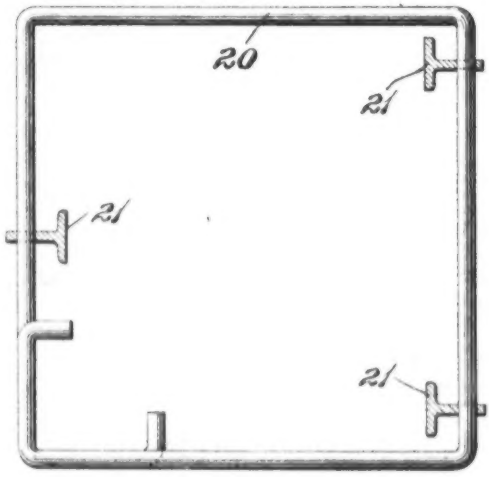
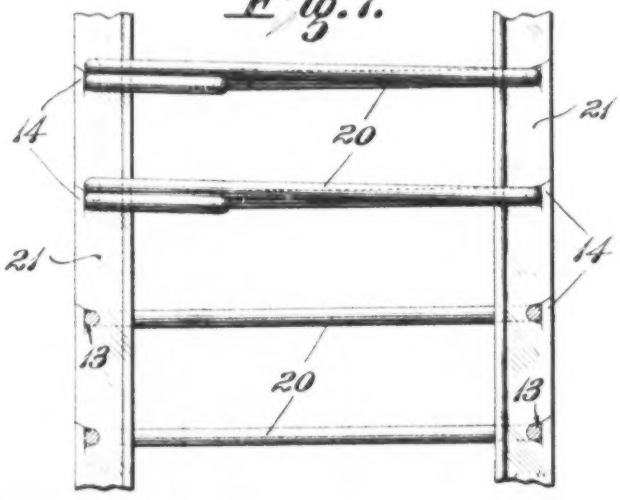


Fig. 7.



Witnesses:

Edgar T. Farmer.

A. M. Holcombe

Inventor:

William H. Burk,

By Carver & Carey

attys

UNITED STATES PATENT OFFICE.

WILLIAM H. BURK, OF ST. LOUIS, MISSOURI, ASSIGNOR TO CORRUGATED BAR COMPANY, OF ST. LOUIS, MISSOURI, A CORPORATION OF MISSOURI.

SPACING DEVICE FOR REINFORCING-RODS IN CONCRETE STRUCTURES.

1,016,319. Specification of Letters Patent. Patented Feb. 6, 1912.

Application filed January 25, 1911. Serial No. 604,686.

To all whom it may concern:

Be it known that I, WILLIAM H. BURK, a citizen of the United States, and a resident of the city of St. Louis and State of Missouri, have invented a new and useful Improvement in Spacing Devices for Reinforcing-Rods in Concrete Structures, of which the following is a specification.

My invention relates particularly to improvements in reinforced concrete columns, pipes, tanks or cylinders, but is applicable to any structure in which spiral reinforcement or a plurality of spaced parallel reinforcing bars is used.

The object of my invention is to provide a simple and efficacious means for securing the metal reinforcement in spaced relationship in the forms or molds preparatory to filling in the concrete in the process of erecting reinforced concrete columns and like structures.

Another object is to provide a secure and rigid mechanical connection between reinforcing rods and a metal spacing device.

A further object of my invention is the production of a spacing device formed from rolled stock of usual shape, such as the ordinary sizes of structural steel and merchant iron, as such stock can be easily and cheaply secured, and I also desire to produce a device which is suitable for transportation without being boxed or crated, and which can be shipped in standard sizes and lengths and cut up at the place of use to suit the work in hand.

Two embodiments of my invention accomplishing these objects are shown in the drawings accompanying this application, in which like numerals are used to designate like parts throughout the several views, and in which—

Figure 1 is a horizontal section through my spacing device used with a spiral reinforcing bar; Fig. 2 is a partial view partly in section and partly in elevation of the same; Fig. 3 is a partial side view of my spacing device showing horizontal bars inserted therein in section; Fig. 4 is a partial side view of my spacing device looking at the edge of the notched flange; Fig. 5 is a section on the line 5—5 in Fig. 3; Fig. 6 is a horizontal section through another form of my spacing device used with looped reinforcing rods; and Fig. 7 is a view in side elevation of the same showing some of the loops in section.

In the form of my invention shown in Figs. 1 to 5, the spacing device comprises a commercial angle-bar 12 provided with notches 13 on the edge of one of the flanges 22 thereof, into which notches the coils 11 of spiral metal reinforce may be inserted to space the coils at the proper distances from each other. Two or more spacing devices may be used with each spiral reinforce, as may be found desirable, to properly space the coils and secure them rigidly in this spaced relationship. The reinforcing member thus made up is ready to be placed as a unit in the form, after which concrete may be placed about it to make up the column or other structure desired without liability of the reinforce being distorted or knocked out of place during the placing of the concrete.

Figs. 6 and 7 show a metal reinforcing unit for a square column or other structure, in which separate loops of metal 20 are held in spaced relationship by spacing devices 21 T-shaped in cross section. The object of using angle-bars, T's, or similar structural shapes is to give lateral stiffness to the spacing device that the assembled structures may not easily be distorted by the accidental bending of the spacing members. Such rolled commercial structural shapes are readily procured in the market and may be shipped uncrated without danger of being injured.

In order to form a secure connection between the spacing device and the metal reinforce with which it is used I have arranged adjacent the notches 13 prongs or tongues 14 which are stamped from the edge of the flange 22 and bent transversely to the flange in the operation of punching out the notches. These prongs 14 are bent nearly at right angles to the plane of the flange 22 and on the side thereof away from the other flange of the angle bar. After the loops 11 of the reinforce are inserted in the notches 13 these prongs 14 are easily bent back to close the open edge of the notch and secure the reinforce therein. This is done at the place of use either before or after the assembled reinforcing member is placed in the form. The spacing members are made up at the factory, away from the place of

use, in lengths convenient for shipment, tied in bundles, and shipped uncrated. At the place of use they can easily be cut to suitable lengths.

For convenience in shipping the spacing device shown in Figs. 1 to 5, made from angle bars, the prongs 14 are bent away from the other flange of the angle-bar, so that looking at the end of the angle-bar the shape thereof is substantially that of a Z-bar, as shown in Fig. 5. These bars are readily packed together with flanges and prongs arranged parallel to each other and thus packed may be tied together and shipped without danger of the prongs being bent through rough handling, as the prongs will not project from the bundle so as readily to catch on adjacent objects. This particular form of spacing device thus lends itself very readily to shipment uncrated without liability of damage to itself, or of inflicting any injury on those handling it.

While I have described specific forms of my spacing device, I do not wish to be limited thereto, but what I desire to secure and protect by Letters Patent is as follows:

1. A spacing device for structural members comprising a longitudinal metal strip having a part projecting from one edge thereof at an angle to the plane of the strip and notches in the other edge thereof, and prongs having a length greater than their width adjacent said notches and projecting from said strip in an opposite direction to the part projecting from the other edge of the strip, the lateral width of said prongs being not greater than the thickness of the part projecting from the opposite edge of the strip.

2. A spacing device for metal reinforce comprising an angle-bar having spaced notches along the edge of a flange and flexible prongs integral with the flange and adjacent the notches, said prongs projecting at an angle to the plane of said flange, and lying in a plane parallel to the other flange and on the side of the first named flange away from the other flange of the angle-bar, the length and lateral width of the prongs being not greater than the width and thickness respectively of the opposite flange, whereby substantially a Z-shape section is formed.

WILLIAM H. BURK.

Witnesses:
A. M. HOLCOMBE,
M. A. SHELTON.

Copies of this patent may be obtained for five cents each, by addressing the "Commissioner of Patents Washington, D. C."

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A. BINDLEY & C. J. MOGAN.

COLLAPSIBLE SPIRAL REINFORCEMENT FOR CONCRETE COLUMNS.

APPLICATION FILED NOV. 14, 1912.

1,115,490.

Patented Nov. 3, 1914.

Fig. 1.

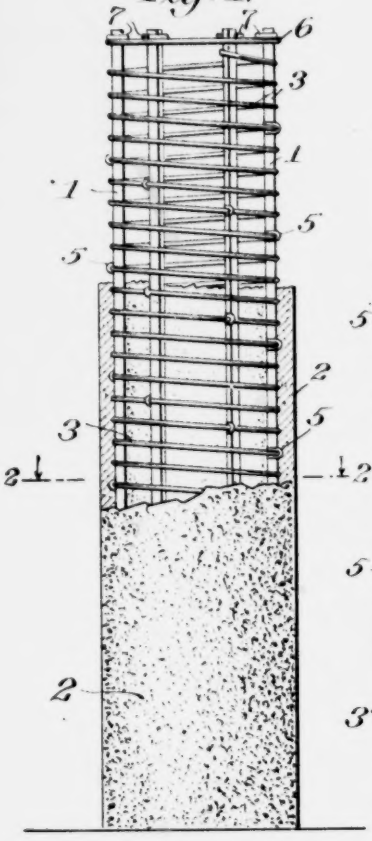


Fig. 3.

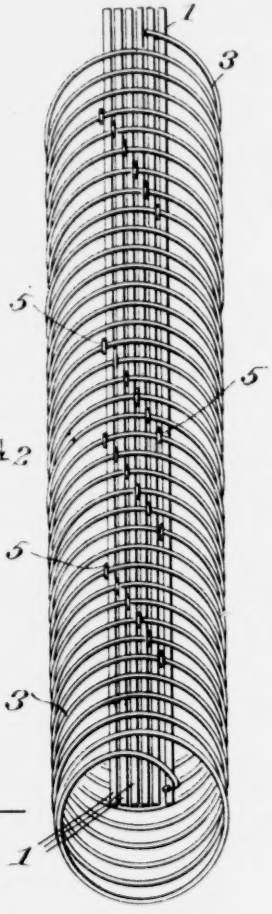


Fig. 4.

Fig. 5.

Fig. 2.

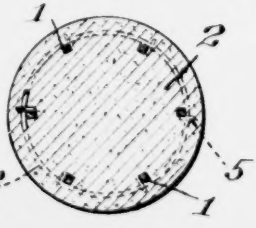


Fig. 6.

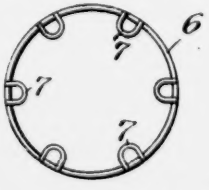
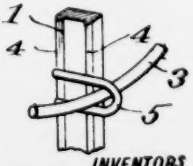


Fig. 7.



WITNESSES

Kathryn M. McMahon

Irene Lefhouse

INVENTORS

Albion Bindley

Christopher J. Mogan

BY

Townsend & Decker

ATTORNEYS

UNITED STATES PATENT OFFICE.

ALBION BINDLEY AND CHRISTOPHER J. MOGAN, OF CHARLEROI, PENNSYLVANIA, ASSIGNORS TO PITTSBURGH STEEL PRODUCTS COMPANY, OF PITTSBURGH, PENNSYLVANIA, A CORPORATION OF PENNSYLVANIA.

COLLAPSIBLE SPIRAL REINFORCEMENT FOR CONCRETE COLUMNS.

1,115,490. Specification of Letters Patent. Patented Nov. 3, 1914.

Application filed November 14, 1912. Serial No. 731,246.

To all whom it may concern:

Be it known that we, ALBION BINDLEY and CHRISTOPHER J. MOGAN, citizens of the United States, and residents of Charleroi, in the county of Washington and State of Pennsylvania, have invented certain new and useful Improvements in Collapsible Spiral Reinforcements for Concrete Columns, of which the following is a specification.

Our invention relates to a metallic reinforcement for concrete structures and particularly relates to such reinforcement for use in concrete columns.

The main object of the invention is to provide a construction which can be cheaply and simply built and which shall also be capable of being collapsed for convenience and cheapness of storage or transportation.

We are aware that it has heretofore been proposed to construct a reinforcement for concrete columns from a series of longitudinal or upright members and a surrounding or encircling member or members disposed and placed upon the upright members and tied or connected thereto, the encircling members being composed of separate, independent bands or the turns or elements of a continuous spiral. Various means have been employed for tying or connecting the encircling member to the upright or longitudinal members of the reinforcement and various constructions of longitudinal member have been employed to facilitate the connection and spacing of the encircling member. We are also aware that it has heretofore been proposed to secure the encircling member or spiral coil to the longitudinal members by notching the edges of the longitudinal members, seating the turns of the encircling member or members therein and closing over the free end of the metal at the notch to hold the encircling member therein in such manner that it will be free to turn. This method weakens the longitudinal members by punching the notches therein and also adds to the cost of construction by the added operation of forcing the free ends over the coils of the encircling member. We are also aware that it has been proposed to provide hooks projecting from the longitudinal members for securing the encircling members thereto but this also necessitates the added operation of turning over the ends of the hooks to secure the encircling member after being seated in the hooks.

The special object of this invention is to simplify the structure, cheapen its cost and particularly to avoid the cutting or slotting of the longitudinal or upright members as well as the added operation of turning or forcing over the ends of the notches or hooks in the manner heretofore proposed, while at the same time affording a proper spacing of the encircling member upon the upright or longitudinal members so as to permit it to turn at the point of connection to collapse the structure.

Heretofore when column reinforcements of this nature have been set up in extended position preparatory to being embedded in the concrete, they have been somewhat wabbly or shaky owing to the pivotal or swiveling connection between the parts.

It is also the object of this invention to avoid this objectionable feature providing means to make the collapsible structure rigid when set up in extended or operative position.

Our invention consists in the construction of metallic reinforcement for concrete columns hereafter more particularly described and then specified in the claims.

In the accompanying drawings, Figure 1 is a longitudinal section through a concrete column showing a metallic reinforcement therefor constructed in accordance with this invention, the upper portion of the column being broken away. Fig. 2 is a horizontal section on the line 2, 2 of Fig. 1. Fig. 3 is a front elevation of the metallic reinforcement in collapsed position, according to one method of collapsing the same. Fig. 4 is an edge view of the reinforcement when in the position shown in Fig. 3. Fig. 5 is a similar view showing another method of collapsing the structure. Fig. 6 is a plan view of the spacing ring detached from the structure. Fig. 7 is a perspective view of a portion of one of the upright or longitudinal members with a portion of the encircling member connected thereto in accordance with this invention.

1 indicates the upright or longitudinal members of the reinforcement. The number and size of these rods or bars will de-

pend upon the size of the column and the load to be carried, as well understood in the art, while 2 indicates the body of concrete in which the reinforcement is embedded.

3 indicates the encircling or surrounding member of the reinforcement comprising, by preference, a continuous rod or wire applied preferably around the outside of the longitudinal members 1 and maintained in spaced relation thereon by the means presently described. The longitudinal members may be round, square, flat or any other form in cross-section. Preferably they consist of rolled bars or rods rolled, by preference, with longitudinal ribs or ridges 4 at or near each edge thereof. (See Fig. 7.) These ribs or ridges may be formed in the rolling operation or they may be formed in any other desired or suitable manner. The ridges 4 form welding projections by which staples or eyes 5 are welded to the longitudinal members 1 and may be continuous or interrupted. The object of the ridges is to facilitate the welding of the staples or eyes 5 by means of the well known electric welding process and it will be understood that other forms of projections as well as other means for providing them might be employed to assist in readily welding the eyes to the members 1.

The members 5 for connecting the encircling member 3 to the uprights 1 are preferably U-shaped wire staples and they are welded to the ridges of the members 1 at the desired points throughout the length of the members so that they project laterally therefrom and form eyes through which the encircling member may be threaded. The welding of the staples or eyes to the members 1 is effected in any proper electric welding machine as will be readily understood by those skilled in the art and in the form shown the staples are secured at four separated points of weld, thus making a very strong joint. The eyes 5 of each member 1 may be spaced apart as desired, there may be one provided on each member for each coil or turn of the encircling member or adjacent upright members may take successive or alternate coils of the encircling member. The preparation of the upright members 1 at the desired points for the electric welding thereto of the eyes 5 in the proper spaced relation may be of any desired kind, as understood in the art, and it will therefore be understood that it would be within our invention to electrically weld the eyes 5 upon the members 1 in proper spaced relation by any expedient or by any desired welding means or operation. Preferably after the welding operation the coils or turns of the encircling member 3 are threaded through the eyes 5 so they become connected to the members 1. The connection between the coils 3 and the eyes 5 is such that the members 1 are free to be slid around the coil toward each other as shown in Fig. 3 and so that the coils are free to swivel or rotate in the eyes to collapse the column as shown in Fig. 4. To collapse the reinforcement, all of the members may be slid into sidewise proximity at one side of the coil as shown in Figs. 3 and 4 or some of them may be moved to one side and some to the side diametrically opposite as shown in Fig. 5 and as will be readily understood in the art.

The eyes 5 are preferably formed of pieces of round wire bent into U shape, but it will be understood that the invention is not limited to this specific form of eye member.

When the reinforcement is expanded into the position for embedding in the concrete, a spacing member 6 is preferably provided at each end of the structure to properly space the longitudinal members 1 from each other and to hold the structure rigid. The spacing member consists of a continuous band preferably of the same conformation as the coils of the reinforcement, the case illustrated being a ring, and is provided in the proper spaced relation with a plurality of clips forming eyes 7 welded to the ring 6. The eyes 7 slip over the ends of the longitudinal members 1 and hold them rigidly in position.

While the invention is particularly useful for reinforcement for concrete columns, pillars, posts or other upright structures, composed of concrete and having the reinforcement embedded therein, we do not limit ourselves to this particular general form of reinforcement, the invention being applicable to other forms comprising essentially a series of longitudinal members and an encircling or surrounding member or members maintained in spaced relation thereon and rotatably mounted in the eyes of one or more of the upright members. It will also be understood that the invention is not limited to locating the encircling member 3 on the outside of the longitudinal members as the same might, if desired, be disposed on the inside of these members in which case the eyes 5 would project laterally toward the center of the structure.

By this invention the necessity of weakening the upright members or causing waste of material by punching out notches to provide seats for the encircling member as well as the necessity of forcing over the ends of hooks or other fasteners to hold the encircling member to the uprights is avoided.

What we claim as our invention is:—

1. In a metallic reinforcement for concrete, a series of longitudinal members provided with welding projections, individual and independent eye members welded at one end to said longitudinal members by said projections and an encircling member hav-

ing its turns threaded through said eyes whereby the turns are adapted to rotate therein to collapse the structure.

2. A reinforcement for concrete columns, comprising a plurality of longitudinal bars, U-shaped members having their ends welded at four points to said bars on the same side thereof and forming eyes at one side of said bars and a spiral coil, the turns of which are located in said eyes and free to rotate therein to collapse the structure.

3. In a collapsible reinforcement for concrete columns, a plurality of longitudinal bars, an encircling spiral rotatively connected to said bars to permit the structure to be collapsed and a spacing ring having clips welded thereto, said clips engaging the longitudinal bars when the structure is in extended position to rigidly couple the members together.

Signed at Monessen in the county of Westmoreland and State of Pennsylvania this 4th day of November A. D. 1212.

ALBION BINDLEY.
CHRISTOPHER J. MOGAN.

Witnesses:
EDWARD H. BINDLEY.
W. W. MCNEILL.

C. A. P. TURNER.

COLUMN REINFORCEMENT AND METHOD OF MAKING THE SAME.

APPLICATION FILED JULY 18, 1911.

1,159,297. Patented Nov. 2, 1915.

Fig. 1.

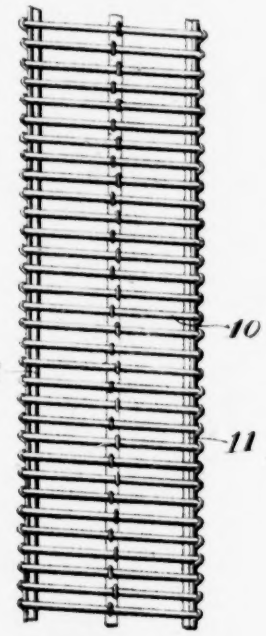


Fig. 2.

Fig. 3.

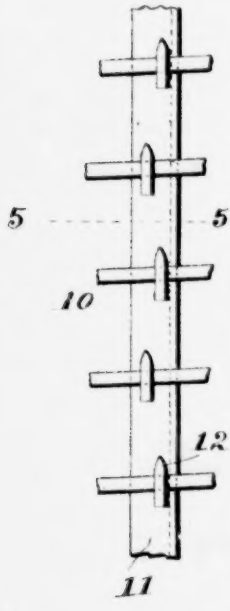


Fig. 4.

Fig. 5.

Witnesses
George L. Barnes
A. F. Haigel

Inventor
Claude A. P. Turner
By Chas. J. Williamson
Attorney

UNITED STATES PATENT OFFICE.

CLAUDE A. P. TURNER, OF MINNEAPOLIS, MINNESOTA, ASSIGNOR TO C. A. P. TURNER COMPANY, OF MINNEAPOLIS, MINNESOTA.

COLUMN REINFORCEMENT AND METHOD OF MAKING THE SAME.

1,159,297. Specification of Letters Patent. Patented Nov. 2, 1915.

Application filed July 18, 1911. Serial No. 639,178.

To all whom it may concern:

Be it known that I, CLAUDE A. P. TURNER, of Minneapolis, in the county of Hennepin, and in the State of Minnesota, have invented a certain new and useful Improvement in Column Reinforcements and Methods of Making the Same, and do hereby declare that the following is a full, clear, and exact description thereof.

The object of my invention is to provide a construction of reinforcement for columns, and the like of concrete, which will be economical to make, light in weight to save freight, and capable of being collapsed or folded down for shipment, to save room and to avoid damage in shipment.

In the accompanying drawings—Figure 1 is a side elevation of a section of column reinforcement embodying my invention; Fig. 2 is an end view thereof; Figs. 3 and 4 are detail enlarged views in side elevation of a portion of one of the spacing bars; and Fig. 5 is a horizontal section on the line 5—5 of Fig. 3.

My invention relates more particularly to the type of column reinforcement in which heavy wire is wound into a spiral, or helical form, and the coils thereof are spaced or held separated suitable distances apart by parallel bars that engage the coils at the desired distances apart. Such a helical form of reinforcement 10 is shown in the drawings, and the coils thereof are engaged and held spaced apart by several, preferably, two light bars 11, the coils being caught by offset curved fingers or hooks 12 integral with the bar, which are formed therefrom by shearing, and offsetting the bar at the desired points, the shear being of such shape that the offset is produced before the complete severance at one end to form the hook, is effected. This procedure in the formation of the hooks saves the offsetting as a separate operation. The bars 11 are light, and preferably they are of angle iron. When the pitch of the coil is slight so that adjacent coils are close together, the engaging tongues or hooks are situated in a staggered, or alternating arrangement as shown in Fig. 3. It will be noted that the fingers, or hooks 12 by reason of their form, or configuration provide a hinge-form connection with the coils of the helix that enables the collapsing and opening out of the structure. This form or configuration of the hooks is that of a reversed curve, that is to say from the point of connection of the hook with the bar, from which it is formed, it curves upward and outward and then around the adjacent coil of the helical reinforcement, which being round in cross section where the hook curves around it provides a snug, or close engagement with the hook that makes a real pivotal connection between the helix and the bar that maintains the proper spacing between the helix coils.

I use but two spacing bars 11 and place them at diametrically opposite points, for thus the coil can be flattened or collapsed, as there can be a turning movement of the individual turns relative to the bars, due to the pivotal connection afforded by the tongues or hooks, and thus the bulk of the reinforcement can be reduced, for, and danger of damage in shipment diminished. Yet, it can easily be restored to its circular or cylindrical form.

Having thus described my invention what I claim is—

A reinforcement for concrete columns, comprising a spiral forming a plurality of spaced circular encircling members round in cross section and spacing bars having integral clips struck out wholly from within the strip body and attached thereto at one extremity and overlying portions of said encircling members and bent thereover in a reverse curve and confining the same against the side of the bars, a pivotal connection being thereby formed between the encircling members and the bars, said bars being two in number and situated diametrically opposite each other.

In testimony that I claim the foregoing I have hereunto set my hand.

CLAUDE A. P. TURNER.

Witnesses:
CHAS. J. WILLIAMSON,
A. T. HAYES.

W. B. HOUGH.

REINFORCEMENT FOR CONCRETE CONSTRUCTION.

APPLICATION FILED MAR. 29, 1912.

1,172,026.

Patented Feb. 15, 1916.

2 SHEETS—SHEET 1.

Fig. 1.

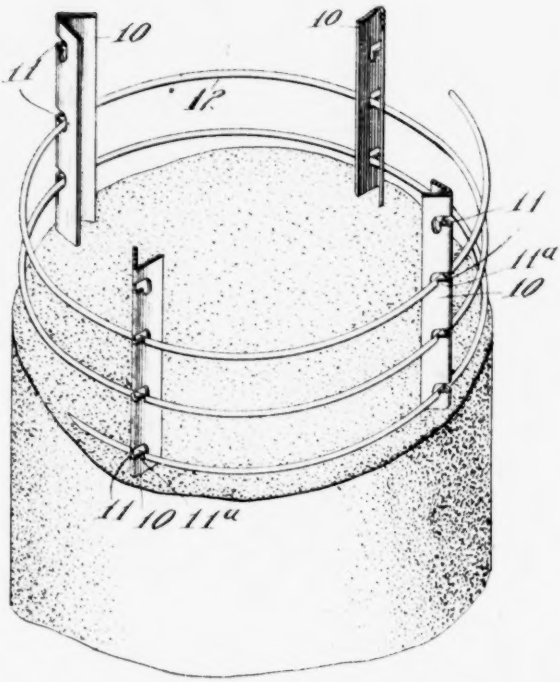


Fig. 3.

Fig. 2.

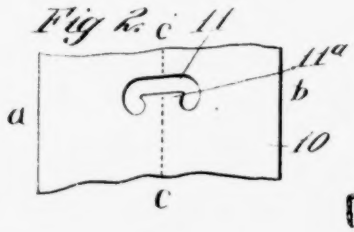


Fig. 6.

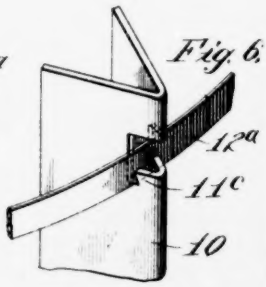


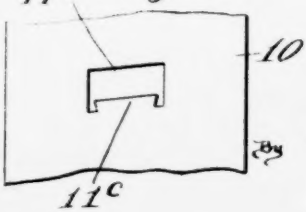
Fig. 4.

Witnesses

Milton Lenox

A. E. Wighton.

Fig. 5.



Inventor

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Attorneys.

307

W. B. HOUGH.

REINFORCEMENT FOR CONCRETE CONSTRUCTION.

APPLICATION FILED MAR. 29, 1912.

1,172,026.

Patented Feb. 15, 1916.

2 SHEETS—SHEET 2.

Fig. 8.

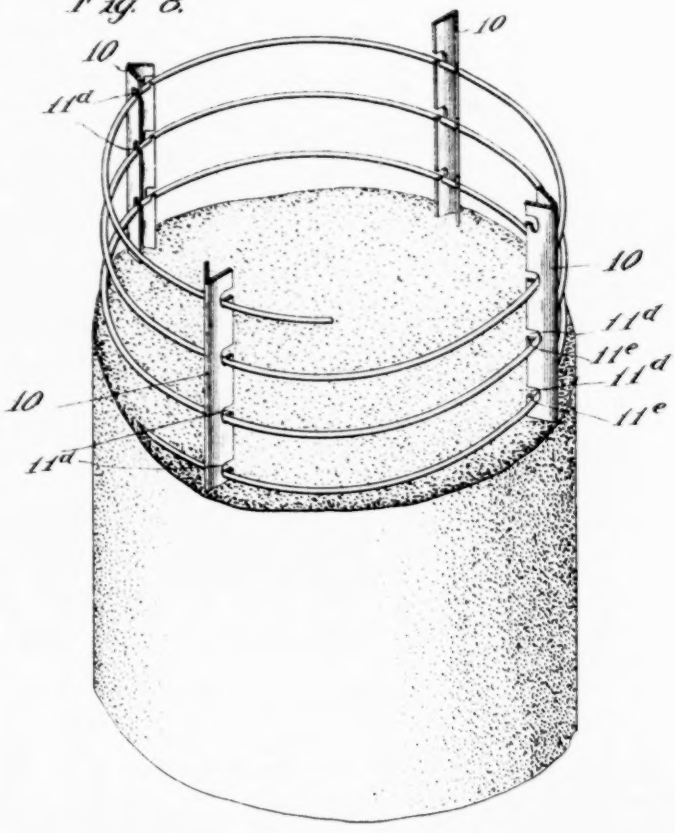
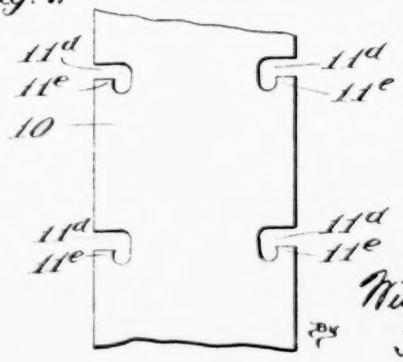


Fig. 7.



Witnesses
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R. E. Wighton.

Inventor
William B. Hough.
Heidman & Street
Attorneys.

UNITED STATES PATENT OFFICE.

WILLIAM B. HOUGH, OF CHICAGO, ILLINOIS, ASSIGNOR TO PATENTED DEVICES COMPANY, OF PORTLAND, MAINE, A CORPORATION OF MAINE.

REINFORCEMENT FOR CONCRETE CONSTRUCTION.

1,172,026. Specification of Letters Patent. Patented Feb. 15, 1916.

Application filed March 29, 1912. Serial No. 687,175.

To all whom it may concern:

Be it known that I, WILLIAM B. HOUGH, a citizen of the United States, and resident of Chicago, in the county of Cook and State of Illinois, have invented certain new and useful Improvements in Reinforcements for Concrete Construction, of which the following is a description, reference being had to the accompanying drawings, which form a part of my specification.

My invention relates more especially to metal reinforcements for concrete construction, such as columns, piles, and the like, whereby an efficient and at the same time inexpensive binder or device is produced which will greatly increase the strength of a column or upright, as will be readily understood from the description herein.

The object of the invention is to produce a reinforcement or device composed of as few parts as would be consistent with practical construction capable of being readily assembled, and which will permit of being folded or put into a collapsed condition for the purpose of shipment or storage, while at the same time permitting it to be quickly extended or set up in proper position without the necessity of special fitting.

The invention is more especially intended for use in connection with the usual forms employed to receive or incase the cement or concrete in which the reinforcement is to be embedded as will be thoroughly understood from the following detailed description of the drawings, wherein:—

Figure 1 is a perspective view of my improved reinforcement shown in its assembled and "set up" condition, being partially embedded in concrete formed in the nature of an upright or column. Fig. 2 is a detail view of a portion of the spacer-blank or vertical member, showing the manner of forming the retaining sockets or openings before the blank has been bent into the desired shape. Fig. 3 is a cross sectional view taken on the line *a*—*b* of Fig. 2, with the spacer-blank bent at its longitudinal center line so as to bring the socket or opening at an outer edge where it is to receive the round or coil of the encircling member of the reinforcement. Fig. 4 is a similar view, illustrating the spacer or vertical member in a slightly expanded condition after the rounds or coils of the encircling element or means have all been inserted in place. Fig. 5 is a detail view of a portion of a spacer-blank shown in elevation, illustrating a modified form of my invention. Fig. 6 is a perspective view of the modified form, showing the spacer-blank or upright bent into proper shape, with a portion of a round or coil of the encircling member or means, also of modified form, shown seated in place. Fig. 7 is a detail view of a portion of a spacer-blank showing another modified form of my invention. Fig. 8 is a perspective view of the assembled reinforcement employing the modified form of spacer-blank or upright shown in Fig. 7; the reinforcement being shown embedded in a concrete column or upright.

For the purpose of illustrating my invention when in its assembled or "set up" condition and the manner of its application, I show the same, in Fig. 1, partially embedded in concrete.

The invention consists of a suitable number of spacing members or elements 10, circumferentially arranged in a vertical position as clearly shown in Fig. 1. The spacing members 10 are preferably formed of strips of flat sheet metal, as illustrated in Fig. 2, provided with suitably spaced cut-out portions 11, arranged preferably at the longitudinal center line of the spacing members. As the spacing members, in the preferred form of my invention, are intended to receive the successive turns or coils of a continuous encircling member, I prefer to arrange the slots 11 at a slight incline, as shown in Fig. 2, so that the slots may coincide with the slight incline of the respective turns or coils of the encircling member; the slots 11, of course, corresponding in number with the number of turns or coils in the encircling element.

The cut-out portions or slots 11 are intended to form pockets or sockets for the turns or coils of the continuous encircling spiral member 12, or for encircling means, when the members 10 have been bent into proper form, which is accomplished by preferably bending the same substantially at the longitudinal center line thereof, as indicated by the dotted line *c* in Fig. 2, or along a line that extends through the longitudinally arranged series of openings, thus providing two portions or legs *a*—*b* arranged perpendicular or at an angle to the encircling means or member 12, as clearly shown in Figs. 1 and 3.

It will be seen that the bending of the spacing means or members in the manner described will bring the cut-out portions or openings at the vertex or bent edge of the spacing means, and provide suitable sockets for the reception of the respective turns or coils of the encircling element 12 or portions of the encircling means.

The slot or opening 11, in the construction illustrated in Figs. 1 to 4, has its ends depended downwardly and slightly presented toward each other, as more clearly shown in Fig. 2, thus providing an intermediate projecting portion 11^a the opposite upper edges whereof slightly extend into the slot, as clearly shown in Fig. 2. The ends of the slot or opening which extend slightly beneath the upper edges of the intermediate portion or tongue 11^a form the sockets or "seats" for the coils or turns of the encircling means or member 12 when the upright or spacing members have been bent into proper form, as shown in Fig. 3.

The intermediate portions 11^a of the respective slots, it will be seen, will prevent the accidental removal of the coils of the encircling means or member. After all of the coils or turns of the encircling member have been properly placed in their respective slots, the vertical or spacing members 10 are preferably slightly expanded as shown in Fig. 4. By thus expanding the members, the coils or turns of the encircling member will be forced into the ends of the opening so as to come slightly beneath the extended corners of the intermediate or lip portion 11^a and be firmly held in place. The vertical or spacing members 10 will properly maintain the different coils or turns of the encircling means in the proper separated or spaced relation to each other.

The encircling means 12 in Figs. 1 to 4, is shown in the nature of a continuous or spiral wire, which is adapted to resist the lateral or transverse stresses that occur in the columns or upright members of the concrete construction. The encircling means may, however, be made in various forms and of any desired length; for example, in Fig. 6, the encircling means is shown in the nature of a flat member or band 12^a, rectangular in cross section. When this form of encircling member is employed, the spacing members 10 are provided with the substantially rectangular cut-out portions or slots 11^b, see Fig. 5, the lower corners whereof are extended downwardly so as to provide the intermediate portion or tongue 11^c. The upper corners of the intermediate portion 11^c preferably extend slightly into the cut-out portion as clearly shown in Fig. 5.

When the coils or turns of the encircling member 12 have been inserted in their respective slots in vertical member or spacer 10, the coils or turns will be seated in the extended lower portions of the slot, as clearly shown in Fig. 6. The spacing member 10 may then be slightly expanded, as shown in Fig. 4, which will bring the extended upper corners of intermediate portion 11^c into frictional engagement with the encircling means, thereby causing the coils or turns of the encircling element 12^a to be firmly gripped or clamped against accidental removal.

Where the encircling member is of considerable diameter, I prefer to employ a number of spacing members so as to properly maintain the coils or turns in the desired spaced relation throughout their length.

The spacing members 10 not only act as spacers for the different coils or turns of the encircling element 12, when the reinforcement is in "set up" position, but the spacers also provide means whereby the encircling element may be readily put into a condensed or collapsed condition. It is evident from the construction shown and described, that the spacing members may be readily slid along the coils or turns of the encircling member, especially when the legs or sides of the spacers are slightly contracted, so that the spacing members, where more than two are employed, may be assembled or brought together at two points diametrically opposite each other. This will permit the assembled spacing members on opposite sides of the encircling element to be moved or forced in opposite directions, thereby bringing the parts of the reinforcement into a collapsed condition with the coils or turns of the encircling element extending almost parallel with the spacers. By putting the reinforcement into the compact form just described, it may be easily handled and at the same time occupy considerably less space than would be the case if it were necessary to maintain the reinforcement in its extended or "set up" condition. To place the reinforcement into its extended or "set up" condition, it is merely necessary to move the oppositely disposed spacing members in a direction opposite to that when collapsing the reinforcement, which will bring the parts into proper position, as shown in Fig. 1.

In Figs. 7 and 8, I show still another modified form of my invention, wherein the upright or spacing members are provided with slots in their outer longitudinal edges instead of in the bent edge or vertex thereof. The slots shown in Figs. 7 and 8 are substantially similar to those shown in Fig. 1.

The slots 11^d extend into the blank from the opposite longitudinal edges, with the respective slots at the opposite sides of the blank arranged substantially in the same plane with each other, and have their inner ends curved downwardly similar to the man-

ner shown in Fig. 2; the inner ends of the slots curve slightly toward the outer edge of the blank, so as to provide the portion or tongue 11^c, beneath which the rounds or coils of the encircling means will be seated.

After all the coils or turns of the encircling means have been placed in their respective slots, the spacers 10, shown in Figs. 7 and 8, are expanded. This will maintain the coils or turns of the encircling means within the slots at a point beneath the tongues 11^c, where they will be firmly gripped.

In Fig. 8, I illustrate another method of assembling the various elements of my improved reinforcement, whereby the spacers are arranged outside of the encircling means, so that the bent or nose portion of the spacers will act as a spacing means or gage to maintain the proper relative position of the encircling means to the outside casing or form.

In practice, the concrete surrounds the different members or elements of the reinforcement on all sides and fills in between the coils or turns of the encircling means and also fills in the openings or slots adjacent the rounds or coils as shown in Fig. 1, so that the reinforcing device and the concrete will be firmly united.

The different members of the reinforcement may be of any desired length and the encircling means may be of any desired size or width.

I have shown and described various forms of my invention as well as different methods of employing the same, but it is apparent that other alterations and modifications may be made without, however, departing from the spirit of my invention. I do not wish, therefore, to limit myself to the specific forms shown and described, but

What I claim as my invention, and wish to secure by Letters Patent, is:—

1. A reinforcement for concrete construction, comprising encircling means, and a plurality of spacers arranged lengthwise of the encircling means, the spacers consisting of sheet metal blanks bent longitudinally so as to provide angularly expansible members, with the portion of said members adapted to contact with the encircling means being provided with transversely extending slots arranged in longitudinal series and of width adapted to permit insertion of the encircling means laterally, the ends of the slots arranged to receive the encircling means being extended downwardly and slightly rearwardly so as to provide an intermediate portion having upwardly presented lips extending into said slots so as to provide restrictions at points where the slots are disposed downwardly, said lips being adapted to grip said encircling means and prevent lateral displacement thereof when said members are expanded.

2. In a reinforcement for concrete construction provided with an encircling element, spacing means comprising blanks of sheet metal bent longitudinally so as to provide angularly expansible members, said members being provided with transversely disposed slots of width adapted to permit lateral insertion of an encircling element, said slots being arranged in longitudinal series with the ends of the slots being extended downwardly and slightly under the main portion of the slots so as to provide upwardly presented portions having corners or lips adapted to form restrictions at points where the slots extend downwardly and thereby provide gripping portions, whereby an element inserted in said slots will be held against lateral displacement when said members have been expanded.

WILLIAM B. HOUGH.

Witnesses:
GEORGE HEIDMAN,
R. E. WIGHTON.

DEFENDANT'S EXHIBIT AA-1.
British Patent.

A. D. 1874, 14*th May*. No. 1715.

CONSTRUCTING BUILDINGS, ETC.,

LETTERS PATENT to Thaddeus Hyatt, of Gloucester Gardens, Hyde Park, in the County of Middlesex, Manufacturer of Patent Lights, for the Invention of "Improvements in constructing, lighting, ventilating and fireproofing buildings, partly applicable to building materials and appliances, and to ships."

Sealed the 24th July, 1874, and dated the 14th May, 1874.

PROVISIONAL SPECIFICATION left by the said Thaddeus Hyatt at the Office of the Commissioners of Patents, with his Petition, on the 14th May, 1874.

I, THADDEUS HYATT, of Gloucester Gardens, Hyde Park, in the County of Middlesex, Manufacturer of Patent Lights, do hereby declare the nature of the said Invention for "Improvements in constructing, lighting, ventilating and fireproofing buildings, partly applicable to building materials and appliances, and to ships," to be as follows:—

The erection of combustible buildings being partly if not mainly, attributable to the ease and cheapness of obtaining materials for such constructions and the difficulty of obtaining cheap and reliable fireproof appliances and materials to make buildings safe, that Invention is most deserving which deals

practically with the subject, by putting upon the market the means for making the construction required.

My improvements have reference therefore to the requirements of trade, for whenever it becomes as profitable to sell fireproof and fire-proofing building appliances and materials as to deal in the other sort, then the community will get the benefit and security of fire-proof houses.

According to another part of my Invention connected with the foregoing, I make openwork corrugated sheet metal by cross corrugating the metal, and cutting the flat portions included within the corrugations so as to form tongues, which tongues are bent outwards, thereby presenting a good holding surface on both sides of the sheet for holding any plastic fire-proofing material with which it may be overlaid. These sheets of metal are light, cheap, and easily applied as fireproof seating to all parts of buildings. When bent in U form and filled with Portland cement, concrete or "beton coignet," these cross corrugated sheets make excellent floor beams for short spans, and if applied side by side on the "all-beam principal," fireproof floors of considerable span may be safely made of them.

According to another method of making fire-proofing sheathing plates of cross corrugated metal, I stamp or press the metal up so that the portions included within the corrugations obtain a considerable elevation, I then perforate the sides of these elevated parts without destroying their shape or strength, so as to admit the plastic filling to pass

through the openings and to thus key itself to both sides of the sheet.

According to another part of my Invention I make beams of interlaced strips of metal or of woven wire shaped and conditioned not only to firmly hold the cement or concrete which fills its interstices, as a part of the body for its protection against fire, but also for its value in resisting compressive strains. These lattice beams may be of various from, box, tubular, H and T shaped, in section.

By one method I braid the metal ribbons or strips into hollow tubes after the manner of braiding whip stocks. These tubes I then use in the shape thus made with the addition of a cement or concrete covering and lining and a special tie rod fastened along its middle bottom line inside the tube, or I place the tube as made in suitably shaped dies, and by mechanical appliances I bring it into some other shape, such as a hollow web and flange or otherwise, and then overlay and prepare it as described.

According to another plan I wind the metal strip or strips around a mandril, and make thus a long spiral closely or loosely coiled and of the length desired. To this coil I attach a tie properly fastened, I then fill and overlay it with cement, concrete or their equivalents. This beam I further perfect in some cases by a metal tie at the top to give it metallic strength, both at the top and bottom.

By another method of operating I make an openwork skeleton beam, or several of them, on a sheet of metal by slitting the sheet, and drawing the metal

ribbons or strips thus made outwards in opposite directions so as to form a hollow openwork tube which may be variously shaped, I then place and fasten a tie in the manner already described, and protect and strengthen the construction by means of cement or concrete as already described.

According to another part of my Invention I combine web and flange beams in a floor construction, upon a system which practically converts each pair of beams into a hollow tube, with reference to the holding and binding power of the top flanges upon the concrete filling underneath them, between the webs of the beams. In this system the beams are placed near enough together to practically form hollow tubes, and of consequence are made as much lighter as there are more of them; the system being the use of a large number of thin light beams set near together in opposition to a few heavy ones set wider apart. These thin light beams I prefer to make with flanges very much wider than are commonly made on such beams, and I prefer to bind a number of them together by cross tie rods passing through openings at the centre of the web of the beams.

According to another part of my Invention I make hollow beams of thin metal of any suitable or known form, and prevent the collapsing of these hollow beams by means of a filling or lining of cement within them.

In the Specification of my Patent, No. 3124, A. D. 1871, I have described tubular beams for an "all-

beam floor," which are cylindrical in shape and in some cases filled solid with fireproofing materials.

By my present improvement when I make a beam in the form of a hollow cylinder, I strengthen it from its interior not by loading it with a complete solid interior filling, but by a lining which may be earthen tubes cemented together within it or a cement or concrete tube formed within it over a core which is afterwards withdrawn. By one plan of construction I make these hollow beams double, that is to say, of two metal tubes one within the other, the interior one by preference being set eccentrically to the outer one, and made fast to it along the middle bottom line of the tubes, the space between them will then be crescent shaped and the concrete filling therein be thickest at the top in the plane of the compressive strain. Tie rods may be added for additional strength, and when so added I use them in the form of a flat bar which I place inside the tubes and there rivet and protect by plaster of Paris or other fire-resisting material. These hollow thin metal beams I also make in all the forms in which solid cast and wrought iron beams are usually fashioned, and I fill the interior space with cement or concrete which preserves it from collapsing. These beams require additional metal for tie rods which I add in the form of flat bars rivetted to the bottom of the beam, as already described.

According to one method I make these beams of perforated sheets of metal, by means of which the exterior coating of cement becomes keyed or interlocked with the interior filling.

According to another part of my Invention I make rolled or cast solid beams with openwork webs for facilitating the incorporating and holding of cement, concrete, or other filling between the beams, and also for holding any fire-proofing material below the beams to protect the bottom flanges from fire.

According to one method the web of the beam is made with a range of openings of considerable size along the middle from one end to the other to admit the interlocking of the concrete from one side to the other of the beam, or to admit the passage of cross bars, beams, tubes, or cylinders, in order to laterally connect, stiffen, and bind any number of beams together in a floor so as to distribute the weight that may come upon it. By a variation of the mode of thus laterally connecting the beams I make beams with countersinks upon their webs, in place of holes, of such a nature as to be capable of holding the ends of hollow tubes placed crosswise between the beams, cross tie rods being used to tighten the construction after the cross tubes are in position.

By another modification, where these large cross tubes are not employed, I form the beam with a range of holes or countersinks near the top flange, or, where no top flange is near the top of the web, for the purpose of holding small cross tubes or cross bars as binders to keep the concrete beneath them from breaking up under strain. But for the purpose of protecting the lower flange of beams against the destructive action of flame I form the beam with a light false flange and web, or with a web only.

This web is made with either a range of holes or a range of countersinks, like those already described for holding cross bars or tubes, and for holding any plastic or other fire-proofing material, the cross bars or tubes when employed also serving as a floor to hold in part the concrete above it between the beams, and as a ceiling to the room below.

In order to protect the lower flange of beams not made with false webs I have devised an appliance to serve the same purpose, which I term a "beam rider." This rider I make in several ways. According to one method, and which I think the best, it is made to be held in place by the weight and pressure of the concrete or other filling between the beams. For this purpose it is so shaped as to not only rest upon the flange, but also to run up behind the filling against the web of the beam, and where formed to overlap the flange at both sides thereof without covering the under face of the flange it runs up and over the top of the beam, resting upon it, and fitting is as a saddle does a horse. Made in this way and in sections they are easily applied when the beam is in position, but if made to be held by and to the lower flange only they would require to be either made in interlocking halves, or be slid upon the beam before it was put in place upon the walls, or be riveted or screwed to the flange. But my object is to avoid labor in attaching as well as needless expense in constructing these riders. The simplest plan therefore is the one to which I give the preference, and which consists merely of a strip of iron bent or made with two angles opposed to each other, the

strip having a horizontal face or seat to take upon the upper face of the flange on one side of the web of the beam, its upper portion from thence running vertically upward against the web of the beam some 3 or 4 inches, and its lower portion from its point of rest upon the flange of the beam running from thence perpendicularly downwards sufficiently far to furnish the required range of holes or countersinks to receive the cross bars or tubes for holding the fire-proofing material underneath the beams, and partially supporting as a flooring the concrete above it between the beams.

When required merely to protect the flange of a beam against fire and to carry no weight, I make them of wire or of perforated metal, or light cast iron, which may be coated with the fire-proofing material before being applied or after being placed upon the beam.

According to another part of this part of my Invention I make a light partition or sheathing material, applicable also as a roof in light constructions, and which for illuminating purposes may be set with glass, as follows:—I take strips or blades of thin metal, which I stamp with countersinks, as already described, and I connect any number of these strips together by means of tubes which fit between them into the countersinks, cross tie rods of wire being employed to tighten and bind the whole together into a sort of grating. This construction I then fill and overlay with any suitable plastic fireproof material to the depth required.

According to another part of my invention I make

a fire-proof beam, and by forming several of them together on the "all beam" principle of construction, I make floors and roofs of the same as follows, viz.:—I use a top and bottom rail of iron, the bottom containing the proper quantity of metal for the tie, and the top containing no more than sufficient for a firm construction, and I connect these rails together by vertical tie rods, which for convenience are made flat and provide at the top with a hole so as to be slid upon the upper rail, and at the bottom with another hole to be slid upon the bottom rail. For double or treble beams these vertical ties are in the form of sheets or plates, with as many holes at the top and correspondingly at the bottom as there are rails or rods to go through them. These vertical ties are placed at suitable distances apart upon the rails, and the intermediate spaces are filled in with cement, concrete, baked brick, or other suitable bracing material, so as to withstand compressive strains and act as a strut to the ties of the beam. I also introduce into these beams and floors under some circumstances as many additional or intermediate rails or rods between the upper and lower ones as may for the special purpose be required, all the rods or rails terminating at either end in a heel block or skew back, to which they are attached, and against which they are screwed up to tighten the mass. The vertical sheet metal ties I prefer to make with sharp and deep horizontal corrugations to take a good hold upon the cement. The bricks may be flat, as ordinary brick are made, but are preferably made to conform to the corrugated sheet ties. The

bricks which I employ for this construction may be solid or shaped to produce when put together tubular or other openings in the interior of the floors they form. I make them however of such form as to admit of their being as readily mortared and masoned together as in the laying of ordinary bricks, wherefore I form half-holes or notches in them at those points where they pass or overlap and lock upon the rails.

A feature of this construction, which is peculiar and constitutes a part of the Invention, is a wedge-shape or form which I give to the bricks, and the method I adopt for combining them together. In making a floor, roof, or walking surface of these wedge-shaped bricks I lay them in two courses, one vertical, the other horizontal. The vertical course break joint with themselves, and the horizontal courses break joint with themselves, and at the same time the vertical and horizontal courses break joint with each other. The vertical courses have their thick ends looking downwards, but the horizontal courses have their facing upwards. By this means the vertical courses, where they have a hold upon te rails, sustain the horizontals, and the horizontals, wheer they obtain a hold upon the rails, support the verticals, the entire series of bricks thus interlocking one another throughout the construction, which gives unity, mutual dependence, and strength to the whole.

According to another part of my Invention I make tubular bricks in the nature of short pipes, so short as to bear the term of collars. These collars or rings

are circular in the interior and square or flat-sided externally, but may vary as to this, it being immaterial whether the internal opening be circular, elliptical, or otherwise, except that I prefer the circular shape for strength. The bricks in this construction are made with shoulders to enter one another when put together end to end, so as to make a perfect tube or tubular beam of the four sides of the bricks; two, the upper and the lower, form respectively floor and ceiling, while the other two clasp metal rails or ties on the right and left, each brick upon these sides being formed with ledges to overlap, underlap, and thus enclose the metal.

A feature in this construction, and which also forms a part of the Invention, consists in the formation of the sides of the bricks, so that while they break joint with each other each range of bricks also interlocks one with the other, thus preventing any single brick from dropping out of its place in the series, should its hold upon the metal become broken.

Another feature of this construction consists in the employment of cross tie rods for binding the parts or ranges of bricks together laterally as above described. The rails or ties mentioned are in the nature of flat bars on edge or I rails or angle iron; one bar only upon each side of any single brick, and between ever two adjoining ones. But I contemplate making these bricks to be used with an upper and lower rail or rod on each side, as herein-before described in connection with the wedge-shaped bricks, vertical sheet ties being also employed as

therein set forth. When I make a construction of this sort I form the sheet ties with openings for the shoulders of the bricks to go through, where they join each other in forming a continuous pipe or tube, the cross ties for laterally binding them together crossing over or under the pipe opening, or both over and under where two ties are employed.

In this construction I also under some circumstances make use of interior thin metal pipes like "stove piping," which I insert in the hollow brick. These metal pipes are made to fit the hollow "collar brick" very snugly, and are cemented therein so as to become a part of them, thereby giving great strength to the continuousness of the pipes, and thus to the floor made of them.

By a modification of this plan I make a floor precisely as here described, except that the bricks are left out and carbonite, concrete, cement, "beton coignet," or other equivalent material used in lieu of the baked bricks, which materials may be either moulded and used in block form like brick, or used in plastic form, and in this state moulded directly upon the tubes and rods in situ. By a modification of the "collar brick" (leaving out one side) it becomes a trough brick. These trough bricks I make especially for roofs, setting them with glass where light is wanted in the roof. I also propose to employ them for floors but naturally in a reversed position, the bottom of the bricks being uppermost to form a walking surface; for greater strength under such circumstance I sometimes make the trough brick with two additional sides, which converts it into an

open box; the added sides serve a cross braces between the iron rods or rails on which the bricks are supported. Where I form a floor of trough bricks with the open sides upwards I sometimes fill the troughs with concrete, and level off for the surface flooring. In other cases I overlay them with flat tiles, which when closely cemented convert the troughs into hollow passages that may be turned to account after the manner of the old Roman "hypercausts." By another modification in the form of a trough or U brick it may be converted into an H or double trough brick, a gutter being formed upon both the upper and under sides. In this form floors and walls may be made by enclosing the troughs so as to produce a double layer of hollow pipes, one set of which may be employed to heat the building, and the other to ventilate it; the warmth upon one side of the partition between the two ranges of flues serving to accelerate the passage of the air by a slight rarefaction of it. In all cases of enclosing tie rods in hollow bricks I prefer to first surround the tie with plaster of Paris fiberized with asbestos.

According to another part of my Invention I make fireproof roof lights of stamped or pressed sheets of metal to be used for the purposes of this my Invention, the peculiarity of which consists in obtaining the best distribution of light by the manner of arranging the corrugations.

By the method now devised by me I stamp or press sheet metal so as to produce an interlaced system of welts or ribs upon one face thereof and gutters or depressions corresponding thereto upon

the other side, the spaces enclosed by the welts or ribs being hexagonal, or in effect hexagonal (for they might be circular and still occupy hexagonal divisions) in shape; these spaces I perforate and set with glass for giving light. This form of metal when set with glass affords the maximum of strength and light with the least expense of metal. A part of this improvement, which however is of a general nature, is in the glass.

As hitherto made the glasses used for "illuminating gratings" have been either made from plate glass or pressed for the purpose in moulds of their own. All these glasses are comparatively thick, and thick glass for resisting flame is inferior to thin.

My improvement consists in closing the apertures of illuminating gratings with blow glass, which may be much thinner than it is possible to press or roll it, and being thin a cheaper quality of glass transmits a better light than if thicker and made by pressure. I also make these glasses in the nature of hollow spheres or partial spheres for greater strength in connection with their lightness; in some cases I make these hollow glasses with closed bottoms to confine a body of air within to prevent "sweating;" and to make them as fireproof as possible I also in some cases incorporate a wire netting or mesh made in hollow spherical form to fit the shape of the glass, the globular wire netting or mesh is place in the mould and the glass blow in upon it, thus incorporating the one within the body of the other.

According to another part of my Invention for making fireproof glass I make plate or rolled glass

with a netting of wire incorporated in the body of the plate, one mode of doing this being as follows:— I use two drums or rollers, as is done sometimes in making ornamental face glass, one behind the other. The former carries a wrap or web of wire netting, which as it rolls down the "metal" is spread out upon the face of te flattened mass; but this "metal" is only half of what is needed to make the sheet. Another dumping of another mass is made immediately upon the first flattened sheet with its overlaying of wire netting, the second mass falling upon the wire netting, where it is met by the 2nd or following roller and flattened out, thus incorporating the wire sheet between two plates of glass welded together.

A part of my improvement in connection with the use of this fireproof plate glass is a method of cheaply applying it to use, this method however being also applicable to other plate or sheet glass. According to the method in common use a frame to contain a number of panes of glass is made in every instance, which involves an expense for special measurements, and is hence fatal to any plan for keeping the article "in stock" or ready to be applied anywhere and by anybody. By my method no such frame is required, each pane of glass whatever its length is set in its own frame or "chase." The chase upon one of its long slides has a tongue like a matched floor plank, and upon the other a groove to correspond, so that when two or more are placed side by side and pressed together with any suitable cement or mastic between them a water-tight joint is made, and any stretch of work over any sized opening may

be readily laid by even an unskilled workman.

For some purposes instead of a complete tongue and groove. I form the chase upon what may be called the half tongue and groove system, a lip or under rest being formed along one long edge or side of the chase and another or over rest is formed upon the opposite side of the chase, so that when two are brought together one takes a bearing upon the other; in this construction I prefer to use light wire cross-tie rods to bind the panels laterally together.

According to another part of my Invention having reference to beams I make an open bottomed or half tubular beam of sheet metal, which I bend into an arch with straight sides, and to each side near the bottom edge I rivet a flat tie, leaving sufficient metal below the tie for a range of holes or of countersinks for the reception of cross tubes, as hereinabove described.

According to another part of my Invention having reference to ventilation and protection against fire in connection with illumination, and which specially applies to ships, I make an illuminating grating (preferably of lignum vitae, or other hard and tough wood, because it does not rust) in two parts or layers, and upper or outer and an under or inner one, the latter containing the glasses. In applying these ventilating lights to ships one grating, that in which the glasses are not set, is fixed permanently in the deck, the other, which contains the glasses, is moveable and attached to the under side of the former. In moving it slides back and forth, bodily carrying the glasses with it into and out of the open-

ings in the permanent grating, so as to either open or close them, each glass being fitted with an elastic collar, and the holes in the permanent grating being tapering, the largest end being on the under side. By this arrangement the glasses are always under the open holes of the fixed rating when they are not in them, which thus not only affords protection against any objects, such as lighted matches and burning cinders falling through the opeings into the cabin below, but also prevents any one there from looking upward under the petticoats of the ladies.

SPECIFICATION in pursuance of the conditions of the Letters Patent, filed by the said Thaddeus Hyatt in the Great Seal Patent Office on the 12th November, 1874.

TO ALL TO WHOM THESE PRESENTS SHALL COME, I, THADDEUS HYATT, of Gloucester Gardens, Hyde Park, in the County of Middlesex, Manufacturer of Patent Lights, send greeting.

WHEREAS, Her most Excellent Majesty Queen Victoria, by Her Letters Patent, bearing date the Fourteenth day of May, in the year of our Lord One thousand eight hundred and seventy-four, in the thirty-seventh year of Her reign, did, for Herself, Her heirs and successors give and grant unto me, the said Thaddeus Hyatt, Her special license that I, the said Thaddeus Hyatt, my executors, administrators, and assigns, or such others as I, the said

Thaddeus Hyatt, my executors, administrators, and assigns, should at any time agree with, and no others, from time to time and at all times thereafter during the term therein expressed, should and lawfully might make, use, exercise, and vend, within the United Kingdom of Great Britain and Ireland, the Channel Islands, and Isle of Man, an Invention for "Improvements in constructing, lighting, ventilating and fire-proofing buildings partly applicable to building materials and appliances, and to ships," upon the condition (amongst others) that I the said Thaddeus Hyatt, my executors or administrators, by an instrument in writing under my, or their, or one of their hands and seals, should particularly describe and ascertain the nature of the said Invention, and in what manner the same was to be performed, and cause the same to be filed in the Great Seal Patent Office within six calendar months next and immediately after the date of the said Letters Patent.

Now Know Ye that I the said Thaddeus Hyatt, do hereby declare the nature of the said Invention, and in what manner the same is to be performed, to be particularly described and ascertained in and by the following statement thereof, that is to say:—

My said Invention relates to improvements in constructing, lighting, ventilating, and fireproofing buildings, partly applicable to building materials and appliances, and to ships; and consists according to one part thereof in making beams of interlaced metal as a convenient means for not only holding concrete or other equivalent material in form when

under the strain of a load, but also as a convenient means of securely uniting a wrought-iron tie or resister to tensile strain to a beam of earthy, stony, or other equivalent material under resistance to a crushing strain; the crushing material and the metal tie forming the actual beam, although any amount additional strength may be put into the interlaced parts if desired. In carrying into effect this part of my Invention I braid or unite metal strips, ribbons, or wire, so as to form hollow tubes, illustrated on Sheet 1 of the annexed Drawings, by Figures 1 and 2, which tubes may be employed in cylindrical form, as shown by Figures 1 and 2, or the cylinders may be drawn through suitable shaping dies or otherwise manipulated until made to represent the forms of ordinary solid beams, such as the web and flange, the U shape, or other forms, as shewn by Figure 3.

a, a, Figures 1, 2 and 3, represent the interlaced metal and *b, b,* the concrete or other equivalent material. Figure 2 represents a beam made of two shells or skeletons of interlaced material and outer one *a, a,* and an inner one *a', a',* both imbedded in the concrete *b, b.* This beam as represented in Figure 2, is hollow but may be solid if preferred. The tie *c* may be rivetted or otherwise attached to the metal skeleton, as shewn, and is preferably placed well up in the concrete to be out of the way of flame in case of being attacked by fire.

Figures 4 and 5 represent the metal skeleton *a, a,* in the form of a spiral made of flat metal ribbon, the tie-rod C being attached to the bottom thereof on the inside as shewn, *b, b,* being the concrete plas-

tie or cement. This spiral coil may, if desired, have wire netting added to it, or longitudinal strips of metal somewhat similar in shape to the tie placed along its sides and top, and fastened thereto as an additional hold to the concrete.

According to another part of my Invention I make the metal skeleton of sheet metal by first cutting it with slits *d, d,* Figures 6, Sheet 2; *e, e,* being the uncut parts of the sheet. I then pull out *e, e,* in opposite directions from each side of the sheet and thereby obtain tubular forms, as shewn by Figures 7, 8, 9 and 10; *e, e,* being the metal; *f, f,* Figure 8, being the concrete; and *c, c,* being the tie-rod.

According to another part of my Invention I make tubular beams of solid sheet metal and tie rods, employing in some cases metal sufficiently heavy to form a material portion of the strength of the beams, and in others to merely serve the purpose of the skeleton beams above described, viz., to unit the tie to the earthy or stony portion of the beam. Figures 11 and 12 represent this form, each being made, as here shewn, of two cylindrical metal shells or tubes, an outer one *a, a,* and an inner one *a'*, *a'*, *c, c,* being the tie rod, and *f, f,* the concrete. The cylinders are concentric in Figure 11, but excentric to one another in Figure 12.

According to another part of my Invention I make floors, roofs, and other constructions of metal beams arranged to be readily connected together laterally with tubes placed between them which serve the purpose of distance pieces, and which are likewise bound together by rods which run through the whole and

are tightened up by nuts at their ends. Figure 13 illustrates this part of my Invention in plan. A, A, A, being three beams placed parallel to each other, *g, g, g,* representing the web of the beams. These webs are provided with protections *h, h,* to receive the ends of the tubes or distance pieces *i, i,* through which pass te rods *k, k,* furnished with nuts *l, l,* to tighten the whole. By using two ranges or layers of these tubes, one at the top and another at the bottom, and imbedding them in plaster of Paris, concrete, or other fireproofing material, a hollow fireproof floor or other construction may be made both light and strong. Figure 14 represents a method of attaching a layer of such tubes to the under side of any number of ordinary web and flange beams, A, A, being the beams, and A', A', the attachment. These attachments may be made of light sheet metal, *h, h,* being the projections on the web *g, g,* of the attachment to receive the distance pieces, *i, i,* and the tightening rods *k, k.*

When an attachment of this description is applied to the lower flanges of beams which make a floor, as shown by Figure 14, part of my Invention consists in forming it of metal sufficiently strong to hold a solid body of plaster of Paris or other fire-proof plastic, which encasing the whole and forming a ceiling to the room below. and at the same time completely protecting the lower flanges (the vulnerable parts of the iron beams) against fire, also enables me to protect the web portions of the beams A, A, by a coating of plaster of Paris, concrete, or equivalent material, which may rest upon the solid fire-

proof ceiling below, and be formed up oven-fashion against the beams on either hand and at top so as to make longitudinal hollow spaces or flues between them. In this way I make light fire-proof floors, which may be described as hollow concrete floors carrying a series of parallel beams with the solid portions of the concrete between the spaces.

Figure 15 represents a construction like that shewn by Figure 13, but set with the glasses *m, m,* in apertures formed in the plaster or plastic material *f, f,* between the metal parts of the construction which may be employed to give light through and form illuminating fireproof roofs, floors, partitions, and other parts of buildings and footways.

According to another part of my Invention for constructing fireproof floors, roofs, and walking surfaces of earthy or stony material to receive the crushing strain in combination with tie rods to resist the tensile strain, I arrange the tie rod in such combinations with the earthy or stony material as to compel it to act simultaneously with it under the influence of a load. To do this the tie must get a hold upon the upper part of the earthly material, whether this material be in the form of concrete, moulded beton, artificial stone, baked or other bricks, or otherwise, in order to avoid breaking out from the bottom of the floor when the strain comes.

According to one method of effecting this purpose where the floor is made of concrete or other plastic material I use an upper and under rail of metal, the lower one being the tie, and connect the two together by vertical metal connections in the shape of hooked

wires or rods, or in the shape of sheets of metal, which may be termed vertical sheet ties. These sheet ties may be of sufficient width to connect any number of parallel rails and ties. In making floors the metal parts are placed first in position over a suitable platform, the concrete is then thrown in, levelled off, and left to set and harden, and the floor is made.

Figure 16, 17 and 18, on Sheet Three, represent such a floor as made of bricks, a peculiarity of which, and which constitutes a part of my Invention, consists in forming the bricks with open slots *r, r,* Figure 17, at the bottom of the brick in order to connect them readily with the tie rods *p, p,* as shown in Figure 18, where also the crooked or hooked rod of iron *v,* heretofore mentioned, shews the manner of holding the rod to the upper part of the brick when sheet vertical ties are not employed. The vertical sheet ties are shewn in Figure 16, at *n, n,* in a corrugated form, but in Figure 18 they are represented as flat. The upper rail is indicated by the letter *o.* This rail may be dispensed with when hooked rods *v* are employed. *q, q,* are holes formed through the brick *s, s,* Figure 17, and constitutes in combination with the thin formation of my brick a part of my Invention.

Figure 17 represests one of my bricks of full size and proportions. With such bricks I construct floors upon the theory that the cement used to bind the bricks together is the main element of the floor, as if a plastic mass were laid, poured, or spread out in quantity sufficient to form a whole floor, and then while still soft the bricks were forced down into it all over the surface and placed at about a half inch

apart. In such a procedure and with such bricks as mine the cement would form the continuous part of the structure connecting itself as it would do around the sides of all the bricks, and through them by means of the holes, and the bricks made spreading like flat roofing tiles, instead of being thick and compact like ordinary building brick would present a proportionately larger area of surface for combining with the cement than do ordinary brick. Floors and roofs of limited span, or made for no great load, may be even constructed thus without ties or any metal whatever, providing good cement be used and sufficient time be given the parts to harden and perfectly unite, for the entire floor, if properly made, will then have become and be precisely like one large slab or stone for strength. The open slots at the bottom of the brick, as seen at r', r', Figure 17, are half slots, as are the holes q', q', half holes, and are made so in order that where two bricks come together edge to edge there may be complete openings, as in the bricks themselves.

In some cases I make the bricks wedge shaped for special constructions, one course of bricks being wedge shaped lengthwise of the bricks, and the following course wedge shaped crosswise of the bricks, tie rods and vertical ties or hooked rods being used with them, as described.

In still other cases and for the purpose of constructing a floor or roof of less weight I make the bricks with a large central opening, or where I desire to unite them on the break-joint plan I make each brick with two half holes back to back. These

bricks when laid together form floors with horizontal parallel flues running through the body of the floor, which may be utilized as hot-air flues or otherwise for convenience of heating and ventilation or for other purposes. By surrounding these holes with rings made like collars they may be joined in a similar manner to connecting joints of stove pipe, or according to a variation of the method thin metal pipes like stove pipe may be employed to give strength to the floors, and with or without tie rods, the metal pipes being inserted into the holes or flues of the bricks described. Still other modifications, but all based on the essential principles of the constructions herein set forth, may be made, but are not necessary to further describe.

According to another part of my Invention, and which relates to fireproofing the light transmitting parts of buildings, I make sheet and plate glass with a wire netting in the glass by providing a suitable sheet of wire netting and placing it upon the casting table when the "metal" is about to be poured out upon it to form the sheet or plate of glass. Figure 19 on Sheet 4 represents such a plate of glass one inch thick, two feet wide, and ten feet long. The wire netting *w* is composed of meshes one and a half inches in size, the diameter of the wire being about one-eighth of an inch. On the under side rods *x*, *x*, of wire, three-sixteenths or one quarter of an inch thick, are fastened at about a foot apart for the purpose of keeing the sheet of wire up from the face of the casting table, and thus enabling the "metal" to

get to the under side of and enclose the netting within the body of the glass.

According to another part of my Invention relating to the construction of the illuminating parts of buildings I cheapen the method of construction where glass in plates or sheets are employed by setting each plate, plane, or sheet in its own chase, as shewn by Figures 20, 21, 22 and 23. Figure 20 represents a metal chase formed with a seat *a, a,* to receive the glass. Upon one side this chase is formed with a tongue, indicated by Figure 1, small, and upon the other it is formed with a groove, indicated by Figure 2, small. Figure 21 shows the manner of uniting such chases after the method of matched floor plank. Figures 22, 23, shew the same, except that in place of a complete tongue and groove half tongues and grooves or a lip and a lap are employed. These chases I also in some cases provide with a wire netting diaphragm in accordance with my former Patents for making safe walking surfaces.

According to another part of my Invention I make ventilating illuminators specially adapted for the decks of vessels, as shewn by Figure 24, where A, A, is a movable plate set with tapering glasses C, C, and B, B, is a fixed plate attached to the vessel's deck, H, H; the fixed plate has tapering light holes D, D, lined with india-rubber gaskets indicated by 4, 4. It has also a stem E cut with a screw thread, upon which in connection with the short rods G, G, attached to the fixed plate the movable plate A, A, slides back and forth when it is desired to open or close the light holes D, D. The movement of the ad-

justable plate A, A, is controlled by the screw nut F, which on drawing the plates together forces the tapering glasses C, C, into the tapering light holes D, D, against the india-rubber gaskets 4, 4, and thus makes a water-tight joint. These ventilating illuminators may also be applied to roofs and to floors and walking surfaces, also as port lights in ships, and in other situations were a ready means of obtaining ventilation is required with protection against the intrusion of water.

Having now described and particularly ascertained the nature of the said Invention, and the manner in which the same is or may be used or carried into effect, I would observe in conclusion that what I consider to be novel and original and therefore claim as the Invention secured to me by the herein-before in part recited Letters Patent is,—

First. Making hollow metal beams of interlaced lattice or openwork, as the holder of a tie rod, to connect the same with concrete or equivalent material, substantially as and for the purposes herein set forth and illustrated by Figures 1, 2, 3, 4 and 5 on Sheet One of my Drawings.

Second. Making hollow metal beams or slitted sheet metal, as the holder of tie rods, to connect the same with concrete or equivalent material, substantially as and for the purposes herein set forth and illustrated by Figures 6, 7, 8, 9 and 10 on Sheet Two of my Drawings.

Third. Making hollow metal beams of sheet or plate metal, substantially as and for the purposes

herein set forth and illustrated by Figures 11 and 12 on Sheet Two of my Drawings.

Fourth. Making floors and roofs of beams and attachments, and floors, roofs, partitions, and walking surface of beams, tubes and tightening rods connected with each other and combined with concrete, plaster, or other equivalent fireproofing material, substantially as and for the purposes as herein set forth and illustrated by Figures 13, 14 and 15 on Sheet 2 of my Drawings.

Fifth. Making floors, roofs, and walking surfaces of bricks shaped, combined, and held together substantially as and for the purposes as hereinset forth and illustrated by Figures 16, 17 and 18 on Sheet 3 of my Drawings.

Sixth. Making thin or tile-shaped brick, and forming them with open bottom slots for ready application to tie rods, substantially as and for the purposes herein described and illustrated by Figures 16, 17 and 18 on Sheet 3 of my Drawings.

Seventh. Connecting the tie rods of floors, roofs, and walking surfaces made of bricks, as set forth in Claim Sixth, with the brick portion thereof by means of vertical sheet ties or by means of hooked rods, substantially as herein set forth and illustrated by Figures 16, 17 and 18 on Sheet 3 of my Drawings.

Eighth. Making sheet and plate glass by combining wire netting with the "metal" upon the casting table, substantially as and for the purposes herein described and illustrated by Figure 19 on Sheet 4 of my Drawings.

Ninth. Combining sheets, panes, or plates of

glass with tongue and groove chases, substantially as and for the purposes herein described and illustrated by Figures 20, 21, 22 and 23 on Sheet 4 of my Drawings.

Tenth. Making ventilating illuminators composed of two plates, the light holes of the upper plate being tapering and lined with india-rubber or its equivalent, and the glasses taking their bearings in the lower plate, substantially as herein described and illustrated by Figure 24 on Sheet 4 of my Drawings.

Eleventh. Combining with ventilating illuminators, as set forth in Claim Ten, the screw shank E steadying pins G, and adjusting nut F, or their equivalents, substantially as and for the purposes herein set forth and illustrated by Figure 24 on Sheet 4 of my Drawings.

In witness whereof, I, the said Thaddeus Hyatt, have hereunto set my hand and seal, this Tenth day of November, in the year of our Lord One thousand eight hundred and seventy-four.

THADDEUS HYATT. (L. S.)

FIG. 1.

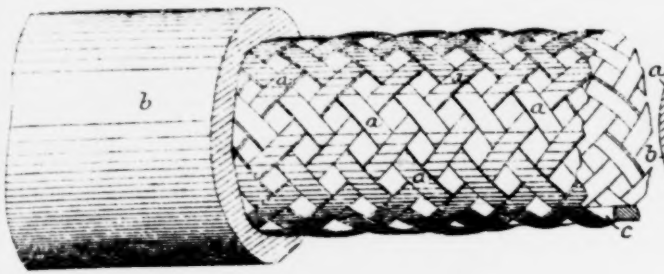


FIG. 2.

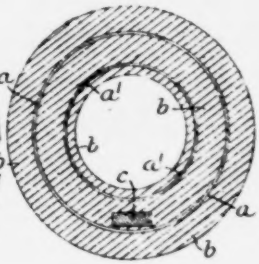


FIG. 3.

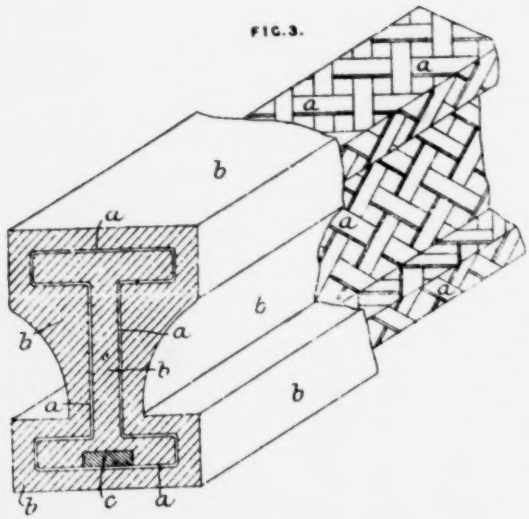


FIG. 4.

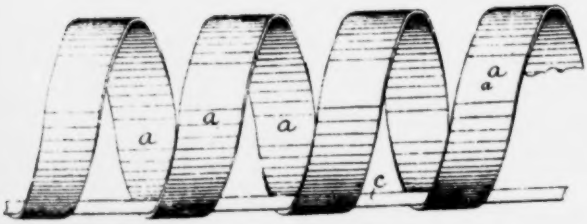
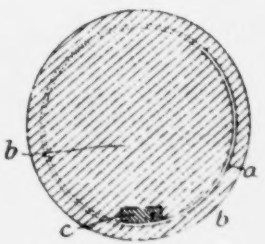


FIG. 5.



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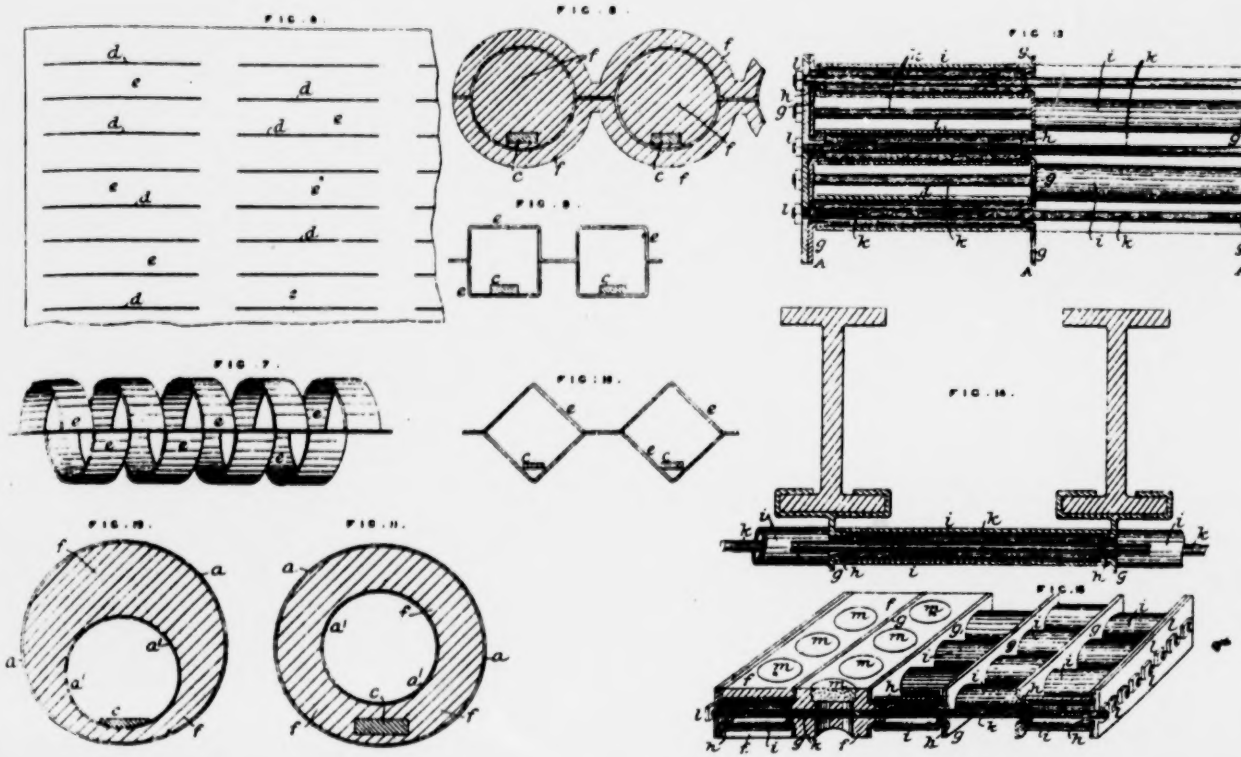

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HYATT'S SPECIFICATION.

FIG. 16.

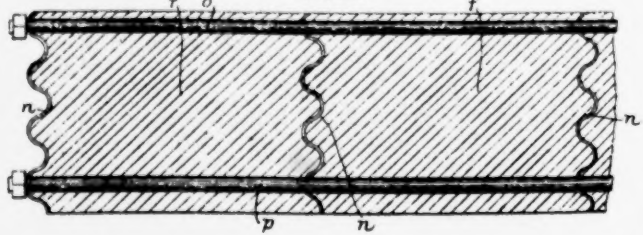


FIG. 17.

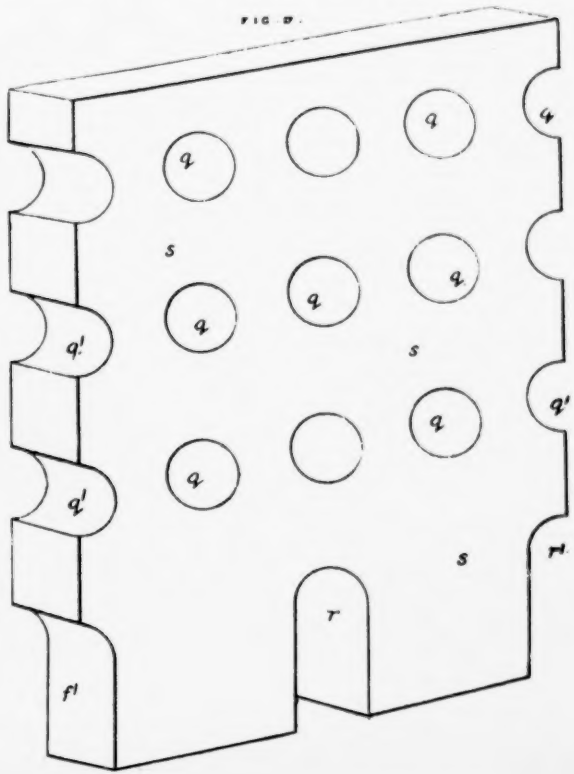
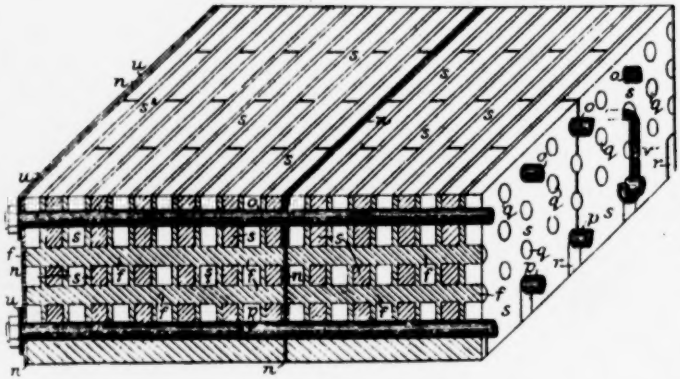


FIG. 18.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(9 SHEETS)
SHEET 4.

FIG. 19.

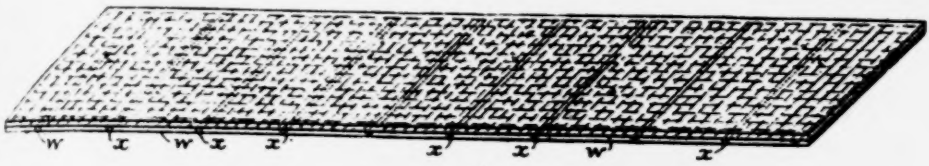


FIG. 21.

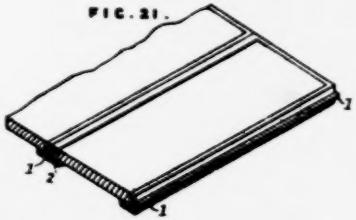


FIG. 20.

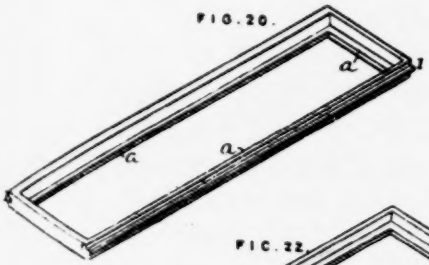


FIG. 23.

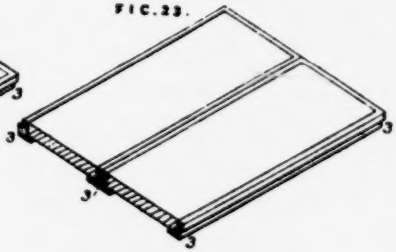


FIG. 22.

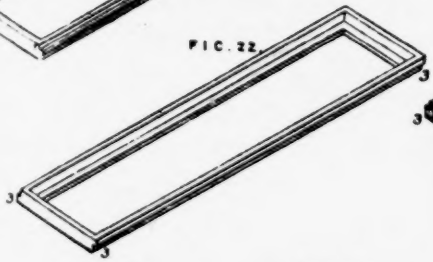
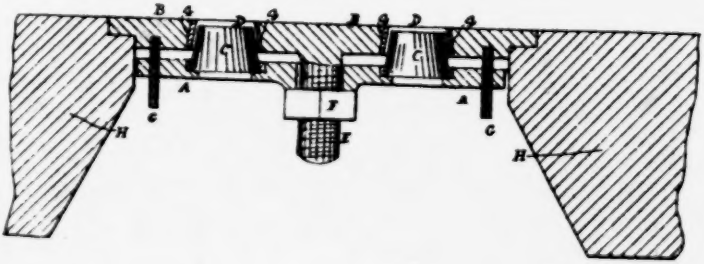


FIG. 24.



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DEFENDANT'S EXHIBIT AA-2.
British Patent 14559 of 1885.

COMPLETE DESCRIPTION

Improvements in the Construction of Fire-Proof Pillars and Columns

We Robert Bristow Lee of 8 Deansgate, Manchester, in the County of Lancaster, Iron Fence Manufacturer, and James Hodgson of Theatre Street, Ulverston in the same County, Colliery Agent do hereby declare the nature of this Invention and in what manner the same is to be performed to be particularly described and ascertained in and by the following statement and accompanying drawings:—

Our said Invention relates to the pillars and columns used in building and for other purposes and consists in an improved method of construction whereby such pillars and columns can be easily and cheaply produced. In making a fire-proof column according to our invention we use a metallic pillar constructed from spiral coils as described in the Specification of Letters Patent No. 4670 of the year 1881 granted to one of us the said Robert Bristow Lee. The said metallic pillar is formed from spiral coils of flat, round, channel angle or tubular iron or steel rivetted together so as to form a cylinder of open trellis work. The interior of such a cylinder is filled with concrete or other fire-resisting material or compound the outer portion being also coated with a sufficient thickness of the same or a similar concrete or material so as to cover and insulate the metallic trel-

leaving the hollow space *d*. The outer envelope *c* is then applied and the column is complete. Instead of using one metallic trellis work cylinder as described we may use two or more than two such pillars arranged concentrically and sustained in their relative positions by ties or supports extending from one to the other. We might also form columns of a triangular square or polygonal instead of a round section, the metallic trellis work skelton being either cylindrical or square of polygonal as desired. In cases where it is found to be necessary provision may be made for expansion and contraction of the column under varying degrees of temperature.

Having now particularly described and ascertained the nature of our said Invention and in what manner the same is to be performed we declare that what we claim is

In the manufacture of fire- proof columns the employment of one or more spirally coiled metallic trellis-work cylinder or cylinders or structure or structures of a round, square triangular or polygonal form and acting as a skelton within and upon or around which concrete or other fire-resisting or suitable material or compound is placed or applied the outer surface being preferably made capable of being treated, decoratively if desired and the whole forming a fire proof column substantially as hereinbefore described and illustrated in the accompanying sheet of drawings.

Dated this 10th day of June, 1886.

DUTTON & FULTON,
Agents.

FIG. 1.

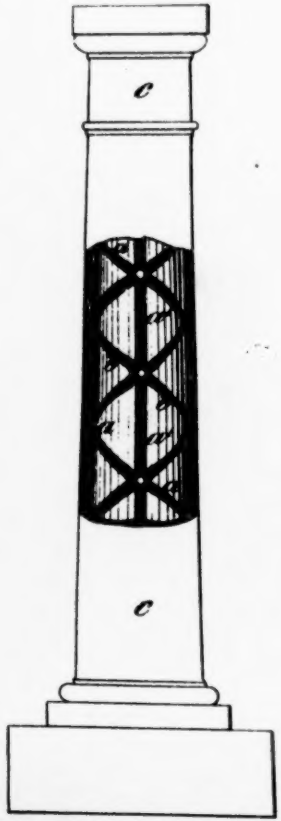


FIG. 2.

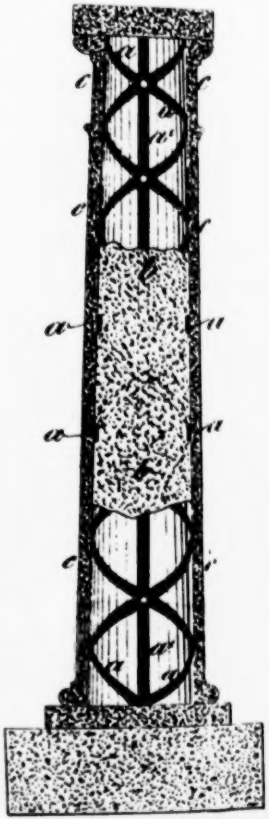


FIG. 4.

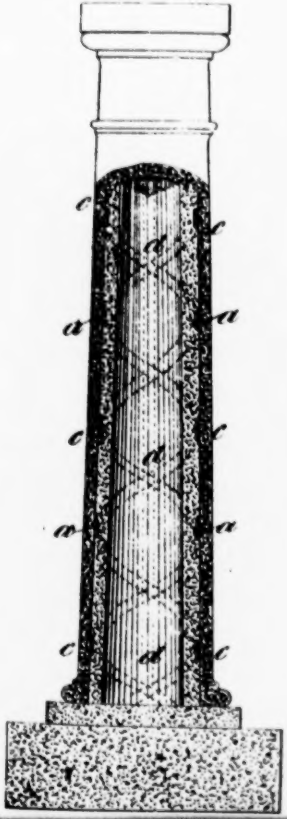


FIG. 3.

FIG. 5.

DEFENDANT'S EXHIBIT AA-3
British Patent.

No. 20,675—A. D. 1902.

Date of Application, 22nd Sept., 1902—Accepted, 27th, Nov., 1902

COMPLETE SPECIFICATION.

Improvements in or Relating to Piles and the Like

I, Maurice Dumas, Engineer, of 6 Rue Watteeu, Brussels, Belgium, do hereby declare the nature of this invention and in what manner the same is to be performed, to be particularly described and ascertained in and by the following statement:—

The present invention relates to a pile and the like and consists of a combined metal and armored cement structure.

The pile comprises essentially an iron or steel casing having the necessary exterior shape which is to be given to the pile, with a filling of beton in which a hollow space is formed, and an interior armor or reinforcement entirely enclosed in the beton and which may be of iron or steel.

The object of such a construction is two-fold; *viz*:

1. To constitute a pile, which, by means of the interior armored cement and the casing may have all the necessary resistance to withstand the strains to which it will be subjected.

2. To obtain by means of the mere resistance of the cement and of the interior army, a solid body of armored cement having all the necessary solidity

and strength, in such a way that if, subsequently, the exerior casing should disappear or become weakened by the action of the water of any substances whatever contained in the water or the ground, in which the pile is inserted, the beton or the interior armature, which themselves are unalterable, are sufficient to secure the stability of the construction.

The exterior casing will be constituted by solid sheet iron, the joining of the meting edges of which may be effected by any means such as rivetting, welding, folding, *etc.*:

The inner armour, parallel and concentric with the outer casing, will be constituted either by round or flat bars or irons arranged in lattice fashion parallel with the direction and generatrix of the cylindrical surface of the pile, or by a perforated or solid sheet iron likewise parallel with the outer caslng.

The filling with beton and the hollow space in the body of the beton may be effected in any suitable manner and the hollow may be of any form which may be found convenient.

This hollow, which is provided in order to reduce the weight of the pile in case of large piles or when the diameter of the pile is relatively large, or from any other reason, is optional, so that the cement filling may be solid.

The piles may be of any desired shape which may be convenient for particular cases and may be driven into the ground by any means.

There may be moreover provided with suitable shoes or parts to enable them to be utilized as screw-piles.

In the annexed drawings is represented, as an example, a round pile adapted to be driven into the ground.

Figure 1 is a vertical section on the line A—B of Figure 2 of a pile with a hollow filling;

Figure 2 is a horizontal section on the line C—D of Figure 1;

Figure 3 is a vertical section on the line E—F of Figure 4 of a pile with a solid filling.

Figure 4 is a horizontal section on the line G—H of Figure 3.

The body of the pile (Figure 1 and 2) is constituted by a sheet iron tube or casing 1, in which is introduced a beton-cement filling 2 having a hollow 3 in body of the cement and an armor 4 formed by round vertical bars and horizontal rings or windings likewise of round iron.

Above the hollow part 3 is a solid part or cover to resist the blows when the pile is being driven in.

The point of the pile is provided with a conical sheet iron shoe 5 having a cast or iron point 6. The outer tube 1 extends above the cement filling so as to form a cavity into which the driving block 7 may strike, an intermediate filling 8 of any suitable material such as felt, sawdust, caoutchouc, *etc.*, acting as a buffer to take up the shock of the sudden impacts and to distribute the force equally over the pile.

In the Figures 3 and 4 the hollow is suppressed, the other parts remaining the same as in the first described pile.

Having now particularly described and ascertained the nature of my said invention, and in what manner

the same is to be performed, I declare that what I claim is:—

1. A pile comprising a metal casing with a filling of armored cement which may be hollow or solid this filling having embedded in it an armor of vertical metallic bars and horizontal rings or windings the pile being provided with a point at its lower end and having at its upper end a cavity formed by the casing extending up beyond the cement and in which is preferably provided a charge of felt, sawdust, caoutchouc or the like substantially as described.

2. The complete pile substantially as described or illustrated in Figures 1 and 2, or in Figures 3 and 4 of the accompanying drawings.

Dated this 22nd day of September, 1902.

BOULT, WADE & KILBURN,
Agents for the Applicant.

This Drawing is a reproduction of the Original on reduced scale.

Fig. 1. (AB).

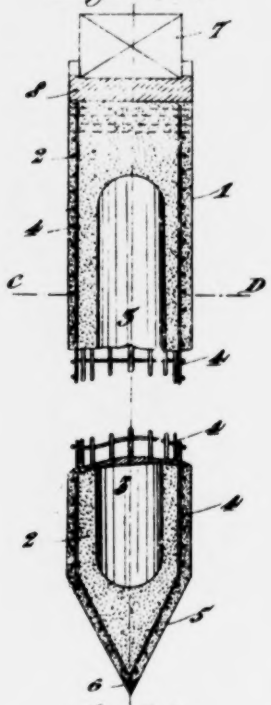


Fig. 2 (CD)

Fig. 3. (EF).

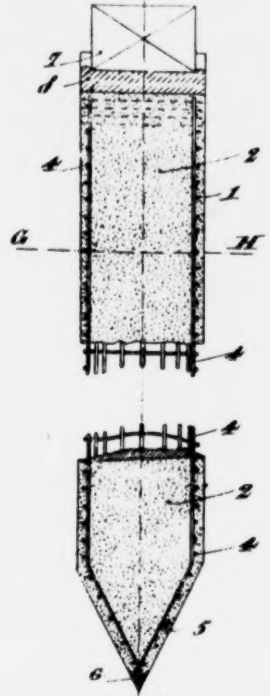


Fig. 4. (GH).

DEFENDANT'S EXHIBIT AA-4.
British Patent.

No. 12,228—A. D. 1893.
Date of Application, 21st June, 1893
Complete Specification Left, 5th Mar., 1894—
Accepted, 7th Apr., 1894.

PROVISIONAL SPECIFICATION.

Improvements in Metallic Sheathing or Coverings for Columns and Other Structural Parts of Buildings.

I, Thomas Lewis Banks, of Holmrook, Cumebrland, F. R. I. B. A. do hereby declare the nature of this invention to be as follows:

Columns and other structural parts of buildings, whether of wood or metal, are frequently covered with metal lathing for the reception of a plaster coating, such as expanded metal, for which purpose there are fixed upon the surface of the column, or other structure, strips of wood, to which the metal lathing is then secured for receiving a coating of plaster. This construction has the disadvantages firstly of the metal lathing being in direct contact with the wood strips, and secondly that considerable labour is expended firstly in fixing the wood strips on the column, &c., and secondly in fixing the metal sheathing on the wood strips.

According to my present invention I dispense with the use of such wood strips and also greatly lessen the labour of fixing the said coverings on the columns, &c.

For this purpose I fix upon the surface of the expanded metal or metal lathing which is to come next the column, &c., longitudinal metal distance pieces, projecting to an extent from the surface of the lathing corresponding to the distance which the lathing is required to be away from the surface of the column, &c.

The lathing thus prepared, then simply requires to be laid upon the surface to be covered, so that the projecting distance pieces bear against the said surface, the metal lathing being then secured in this position by any suitable means, such as, in the case of columns, by merely drawing the edges of the lathing close together and securing them in that position.

For the said distance pieces I prefer to employ strips of thin metal bent to form a cross section of U or V shape with flanges at the edges, and I secure such strips with their flanged side against the lathing, the flanges being slit so that portions thereof can be bent around the meshes of the lathing in order to securely fix the strips thereto.

This construction of the distance pieces has the advantage of affording a certain amount of elasticity so that when the lathing is laid round the column with a certain amount of pressure, the distance pieces will be somewhat compressed, so that on releasing the lathing from the external pressure after fixing it, the elastic grip exercised by the distance pieces upon the column will hold the lathing securely in position.

Dated this 21st day of June, 1893.

ABEL & IMRAY,
Agents for the Applicant.

COMPLETE SPECIFICATION.

Improvements in Metallic Sheathing or Coverings for Columns and Other Structural Parts of Buildings.

I, Thomas Lewis Banks, of Holmrook, Cumberland, F. R. I. B. A., do hereby declare the nature of this invention and in what manner the same is to be performed to be particularly described and ascertainedby the following statement:—

Columns, walls and other structural parts of buildings whether of wood or metal, are frequently covered with metal lathing for the reception of a plaster coating, for which purpose there are fixed upon the surface of the column, or other structure, strips of wood, to which the metal lathing is then secured for receiving a coating of plaster. This construction has the advantages firstly of the metal lathing being in direct contact with the wood strips, and secondly that considerable labour is expended both in fixing the wood strips on the columns, &c., and in fixing the metal sheathing on the wood strips.

According to my present invention I dispense with the use of such wood strips and also greatly lessen the labour of fixing the said covering on the columns, &c. For this purpose I fix upon the surface of the metal lathing which is to come next the column, &c., longitudinal metal distance pieces projecting to an extent from the surface of the lathing corresponding to the distance which the lathing is required to be away from the surface of the column, &c. The lathing thus prepared, then simply requires

to be laid upon the surface to be covered, so that the projecting distance pieces bear against the said surface, the metal lathing being then secured in this position by any suitable means, such as, in the case of columns, by merely drawing the edges of the lathing close together and securing them in that position.

For the said distance pieces I prefer to employ strips of thin metal bent to form a cross section of U, V or other shape with flanges at the edges, and I secure such strips with their flanged side against the lathing, the flanges being slit so that portions thereof can be bent round the meshes of the lathing in order to securely fix the strips thereto. This construction of the distance pieces has the advantage of affording a certain amount of elasticity so that when the lathing is laid round the column with a certain amount of pressure, the distance pieces will be somewhat compressed, so that on releasing the lathing from the external pressure after fixing it, the elastic grip exercised by the distance pieces upon the column will hold the lathing securely in position. When employing this construction for covering flat walls, the said flanged metal distance pieces are more conveniently fixed by nails or screws to the wall in the first instance, and after the metal lathing has been laid upon them, slit portions of the flanges are bent round the meshes of the lathing so as to secure it in position.

Fig. 1 of the accompanying drawings shows part of a column covered with metal lathing according to my above described invention. Fig 2 shews a cross section. Fig. 3 shews the metal lathing A pre-

pared with the metal distance pieces B secured thereto previous to its application to the column. When thus prepared it is laid round the column as at Figs. 1 and 2, and the meeting edges are drawn tight and secured by lacing wire or other fastenings, the elastic nature of the distance pieces enabling them to be slightly compressed so as to insure a perfectly tight fixture of the lathing, upon which is then laid the plaster covering C. Thus the metal lathing with its plaster covering will constitute a fire-proof sheathing to the column secured at a distance from its surface and thus affording a very effectual protection to the latter against fire. The distance pieces B may either be of the V form shewn at Fig. 4, or of the U form shewn at Fig. 5 or of the Z form shewn at Fig. 6, the flanges *b* being slit in any convenient manner as at *b'*, *b'*, and bent round the metal lathing. This is by preference formed of interlaced twisted metal strips. Fig. 7 shews my invention applied to the fixing of metal lathing to a wall; the distance pieces B, B, are in this case fixed to the wall by nails in the first instance, and the lathing A is then secured to them in the above described manner for receiving the plaster covering C.

Having now particularly described and ascertained the nature of my said invention and in what manner the same is to be performed, I declare that what I claim is:—

1. In metalic sheathing or covering for columns, walls and other structural parts of buildings, the use in combination with metal lathing, of metal distance pieces secured thereto in such manner as to

keep the lathing a certain distance from the surface to which it is attached.

2. Constructing metal distance pieces such as are referred to in the preceding claim of a V, U, Z, or other flanged section the flanges being slit for affording means of securing the lathing thereto, substantially as described.

Dated this 5th day of March, 1894.

ABEL & IRMAY,
Agents for the Applicant.

Fig. 1.

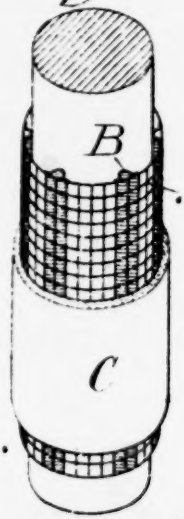


Fig. 4.

Fig. 5.

Fig. 2.

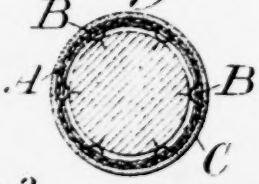


Fig. 3.

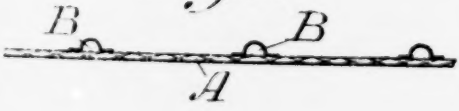
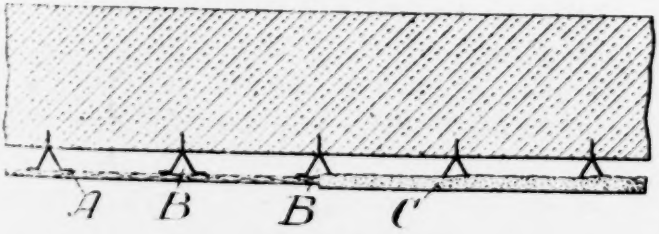


Fig. 6.

Fig. 7.



[This Drawing is a reproduction of the Original on a reduced scale]

London: Printed for Darling and Son Ltd.
for Her Majesty's Stationery Office. 1894.

Malby & Sons, Photo-Lith.

DEFENDANT'S EXHIBIT AA-5.

British Patent.

No. 24,371—A. D. 1904.

Date of Application, 10th Nov., 1904—Accepted, 12th Jan., 1905

COMPLETE SPECIFICATION.

"Improvements in and Connected with Reinforced or Armoured Concrete Construction."

I, Edmond Coignet, of 20, Rue de Londres, Paris, France, Armoured Concrete Constructor, do hereby declare the nature of this invention and in what manner the same is to be performed, to be particularly described and ascertained in and by the following statement:

This invention relates to reinforced or armoured concrete construction. The general principle governing this kind of construction is to employ the iron reinforcement to resist the tensile stresses and the beton or concrete to resist the compression stresses; and in bodies required to resist flexion it is desirable to leave as much space as possible between the bars which take the tensile stress and the concrete which takes the compression. This rule, however, need not be strictly adhered to in practice, and according to the present invention compression bars as such are also employed to lessen the dead weight, to permit of suitable connection between the tensile and compression parts by metal ties, and to enable beams to be prepared in advance, which after

being placed in position support the centering which bears or supports the fresh concrete as it is laid down, thus assisting in the general resistance of the work.

The use of compression bars, their arrangement and that of the metallic ties substantially as hereinafter described, form the essence of the present invention.

The accompanying drawings illustrate various constructional parts according to the invention.

Figures 1 to 6 are transverse sections illustrating the application to flooring and beams.

Figures 7 to 12 illustrate the application to pillars, columns and pipes.

Figure 13 illustrates the application to a domed roof or arch.

In carrying out the invention according to one mode in the application to flooring and supporting beams thereof as shown in Figure 1 cores are employed preferably consisting of round steel bars, the tensile bars *a* of the beams being connected to the compression bars *b* and therefore to the concrete by means of round iron ties *c*. These ties, bent into U-form, after passing around the tensile bars *a* are twisted by means of pincers, and the ends are bent back to the right and left and thereby connected to the bars *d*, embedded in the under layer of the flooring. The ties are preferably arranged along the beams or ribs at distances increasing as they leave the supports towards the centre of the beams. They may however be arranged obliquely. In cases where the distance between the compression bars and the

tensile bars is excessive, auxiliary longitudinal bars *e* may be used, as shown in Figure 2, the bars *e* being connected to the ties *c*, by annealed iron wire. The bars *e* are only of small diameter as they are only intended to prevent a large area of concrete being left without a core.

When a number of tensile bars *a* are used in a beam, cross pieces *f* may be provided so as to uniformly distribute the stresses over all the bars, as shown in Figure 3.

The plane of the underlayer or flooring connecting the beams or ribs is also reinforced. This is effected in one manner by main bars, *d*, Figures 1 to 3, which rest on the compression bars *b*, of the beams or ribs, but as bent downwards immediately on each side so as to reinforce the lower layer of the flooring as near as possible to the tensile surface.

Additional reinforcement is effected by secondary bars *g*, Figure 4, arranged parallel to the ribs or beams and directly above the main bars *d* which are at right angles to the beams. The primary and secondary bars *d*, *g*, are bound together, where they cross each other, by annealed iron wire.

When there is necessity for a very heavy slab or floor, compression bars *h* and ties *i*, Figures 5, may be employed similarly as before described for the beams. In this case the compression bars *h*, rest on the compression bars *b* of the beams, but they are not inclined or bent but remain parallel to the compression surface of the slab or floor.

The cores being mounted as described in the desired positions for the slab or floor and for the beams,

the concrete or beton is spread or moulded, that for the beams in boxes and that for the floor or slab on centering. Sometimes it is desirable to mould the beams in advance. In such a case the compression bars *b* are arranged tangentially to the upper surface of the beams, the ends of the ties *c*, projecting ready for connection to the main bars *d* of the floor which is to be laid down, as shown in Figure 6. In this case the section of the compression bars ought to be rather strong in order that the reinforced concrete beam made in advance can support the slab or floor and also the centering supporting it. For this purpose suitable holes are made in the beams through which bolts or the like *j*, may be passed to secure planks *k*, for supporting the centering *l*.

The above described method of construction may be applied to plane surfaces whether ribbed or not and capable of resisting flexion, such as floors or retaining walls.

In applying the invention to structures intended to solely resist compression such as pillars, buttresses or arches the arrangements illustrated by Figures 7 to 10 and to 12 are adopted. The pillars, although generally of square section, may be of rectangular or circular section. In the case of one of square section as shown in cross sectional plan in Figure 7, the core or reinforcement comprises four round bars *m*, held apart by thinner bars *n*, to which they are tied by annealed wire. The bars *m*, are situated in the corners or angles. Sometimes four or other number of intermediate longitudinal bars *o*

of small diameter may be used for supporting the beton or concrete between the principal bars.

For pillars of circular section and more especially for reinforced concrete piles the ties *m*, are circular, forming open rings the ends of which are bent back so as to hook automatically and successively onto two main neighbouring bars *m*, as shown in Figure 8 which shows in elevation, plan and detail enlarged plan the reinforcement employment. The arrangement is such that all the longitudinal bars *m*, are interlocked in this manner, the bars being in the example shown in Figure 8 more numerous and closer together than in that shown in Figure 7.

The pillars usually terminate at the upper parts in consoles, which connect them to the beams, and at the lower part in reinforced concrete soles stiffened by four or more consoles.

Figure 9 shows a section in plan and Figure 10 in vertical section the form of core used for these consoles comprising bars *p* and ties *q;* the projecting parts forming the soles also being shown. In this case the main bars *r* of the soles are arranged in two directions.

Figure 11 illustrates in part sectional elevation and cross section a pipe for liquids under pressure as an example of the arrangement adopted for bodies required to resist tensile stresses. In such a case the main cores *s*, are wound in a helical manner with preferably a fine pitch whilst the secondary cores *t* are fitted inside the main cores. External helices *u* of long pitch are provided for stiffening the whole. The pipes are manufactured in convenient lengths

in some cases ten feet, and the lengths are joined by sleeves *x* or short pieces of similar piping of slightly larger internal diameter than the external diameter of the pipes to be joined, a suitable cement being inserted in the intervening space. For circular tanks or reservoirs the same construction is adopted as for pipes.

When the diameter is very large, say more than thirty feet, in addition to the main cores *s* (or rings composed of segments joined by overlapping the bent ends) and also in addition to the secondary rectilinear cores *t*, thicker vertical iron bars *v* may be spaced at intervals as shown in Figure 12. These iron bars *v* are used so as to facilitate the construction of the core properly speaking, more especially in the case of domes. In the case of a spherical dome or conical roof or arch the thrust may be equilibrated by an upper reinforced band *w* of suitable section as shown in Figure 13 which is a part sectional elevation.

Having now particularly described and ascertained the nature of my said invention and in what manner the same is to be performed I declare that what I claim is:—

1. Reinforcing concrete constructions in the manner hereinbefore described with reference to Figures 1 to 6 of the drawings.

2. Reinforcing concrete constructions in the manner hereinbefore described with reference to Figures 7 to 10 of the drawings.

3. Reinforcing concrete constructions in the

manner hereinbefore described with reference to Figures 11 to 13 of the drawings.

Dated this 10th day of November, 1904.

MARKS & CLERK,
18, Southampton Building, London, W.C.
13, Temple Street, Birmingham, and
30, Cross Street, Manchester.
Agents.

[This Drawing is a reproduction of the Original on a reduced scale.]

A.D. 1904. Nov. 10. N° 24,371.

COIGNETS' Complete Specification.

[This Drawing is a reproduction of the Original one reduced scale.]

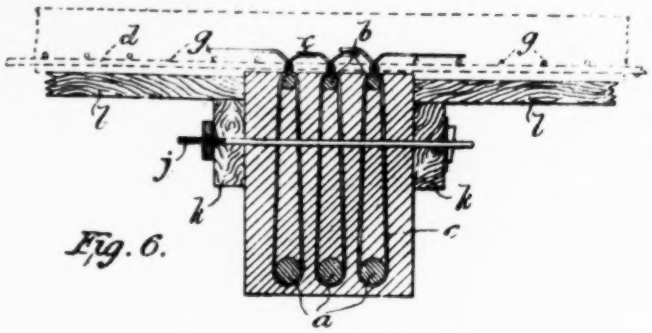


Fig. 6.

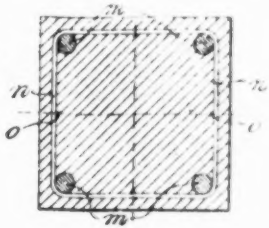
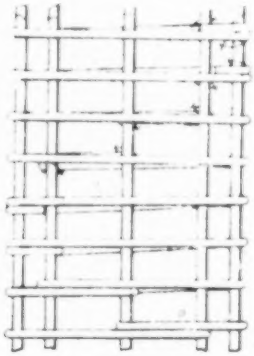


Fig. 7.



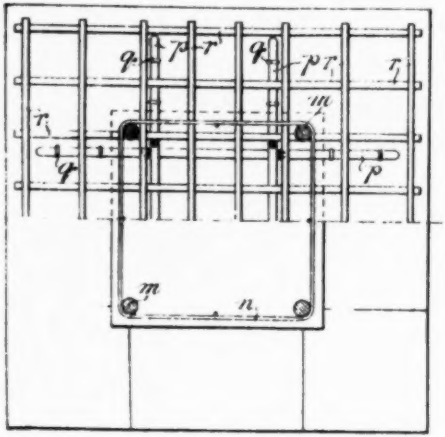
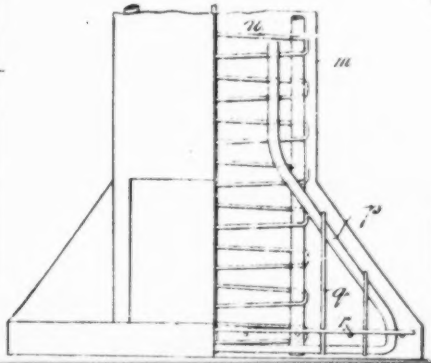


Fig. 9.



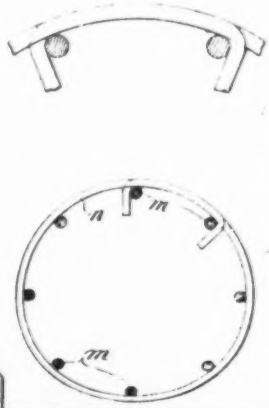


Fig. 8.

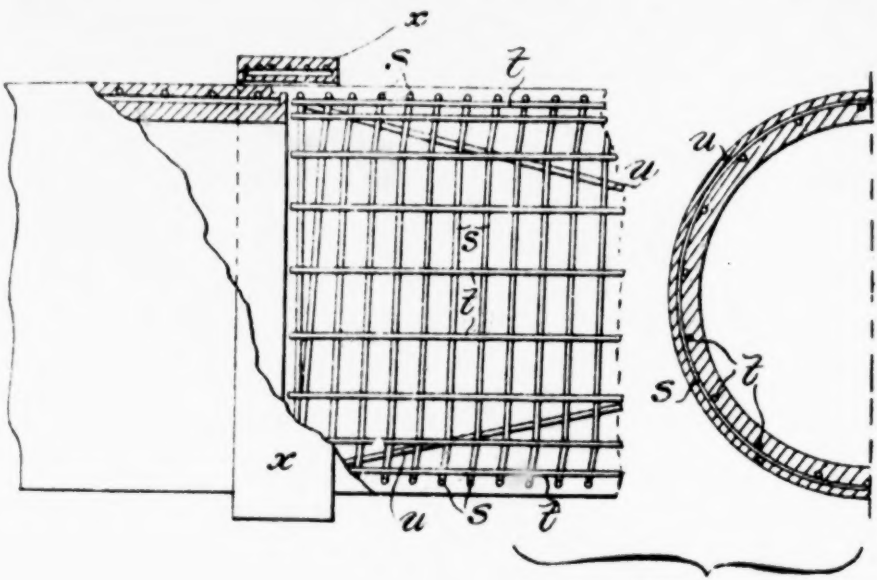


Fig. 11.

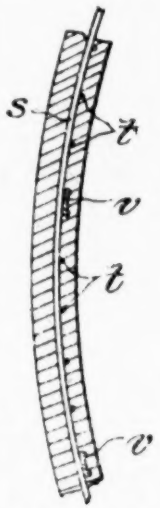


Fig. 12.

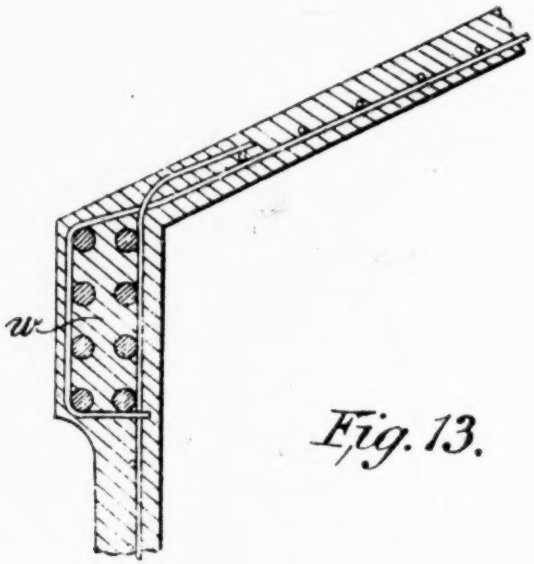
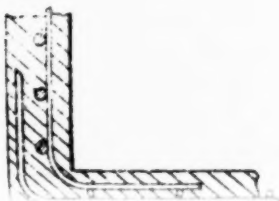


Fig. 13.



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DEFENDANT'S EXHIBIT AA-6.

REPUBLIQUE FRANCAISE.

OFFICE NATIONAL D ELA PROPRIETE INDUSTRIELLE.

BREVET D'INVENTION
du 21 juin 1902.

(Library Apr 20 1903 U. S. Patent Office)

VII.—Travaux de construction.
1. Materiaux et outillage.

Brevet de quinze ans demande le 21 juin 1902 par M. PELLEGRIN (Joseph), *pour tuyaux en beton de ciment arme a manchons et a emboitements.* (Delivre de 10 novembre 1902; public le 6 mars 1903.)

L'invention est relativ a des perfection-noments apportes dans la construction de tuyaux en beton de ciment arme, donnant au point de vue industriel un produit nouveau denomme (tuyau en beton de ciment arme a manchon et a emboitement).

Lesdits tuyaux peuvent se fabriquer, de tous diametres, de toutes longueurs et de toutes formes utiles a l'industrie et au commerce toujours avec manchon et emboitement.

DETAILS DES DESSINS.

Figure no 1.—Presente un tuyau droit de trois metres de longueur non compris le manchon et l'emboitement.

Figure no 2.—Presente une coupe dudit tuyau suivant A. B.

Figure no 3.—Presente l'ossature metallique d'une seule piece avec manchon.

Figure no 4.—Presente une coupe sur C. D. de ladite ossature.

Figure no 5.—Presente deux tuyaux assembles avec leur manchon et emboitement et la coupe d'un joint fait.

Comme dans la figure no 3, on voit l'ossature metallique qui est confectionnee d'une seule piece avec son manchon qui est compose de directrices longitudinales et de spires, l'epaisseur et l'ecartement du metre et l'epaisseur du tuyau ainsi que la resistance a obtenir; l'ossature terminee est ensuite logee dans des moules faits a dessein, puis, on procede au coulage du beton de ciment, qui est compose de 300 litres de sable lave et de 700 litres de ciment portland.

REVENDICATIONS.

En resume, je revendique le perfectionnement dans les tuyaux en beton ciment arme decrit ci-dessus et presentes sur le dessin cijoint et dont les points caracteristiques et essentiels sont:

1 re figure.—Tuyaux en beton de ciment arme, avec manchons et emboitements.

2e figure.—L'ossature metallique d'une seule piece, avec son manchon a emboitement.

3e figure.—L'assemblage des tuyaux par le manchon a emboitement et joints en ciment.

Lesdits tuyaux, peuvent etre employes partout ou

il peut en etre fait usage, tant dans l'industrie que dans le commerce.

Izeaux, le 21 juin 1902.

Joseph PELLEGRIN.

Prix du fascicule: 1 franc.

FRENCH PATENT No. 323,457.

The invention relates to improvements involved in the construction of reinforced concrete tubes, producing from an industrial point of view, a new product called (jointed reinforced concrete tube).

The said tubes can be manufactured of any diameter, of any length, and of any form desired, in industry and commerce always with mating ends.

Details of the Drawings.

Figure No. 1—shows the exterior of a jointed tube two to three meters in length.

Figure No. 2—shows a section of said tube on line A-B.

Figure No. 3—shows the metallic framework of a single length with connecting sleeve.

Figure No. 4—shows a section on C-D of the said framework.

Figure No. 5—shows two tubes assembled with their mating ends assembled and the joint in section.

As shown in Figure 3, the metallic framework is seen, which is manufactured of a single piece, with its female end, which is composed of lengthwise and spiral strands. The thickness and the mesh of the metal used are always calculated according to the diameter and thickness of the tube, so that the necessary resistance is obtained. The finished framework is then placed in molds of the proper design, then the cement is cast, which is composed of 300 liters of washed sand and 700 liters of Portland cement.

Claims.

In summary I claim the improvement is reinforced concrete tubes above described and shown in the subjoined drawing and of which the characteristic and essential points are:

1st figure—Reinforced concrete tubes, having male and female connections.

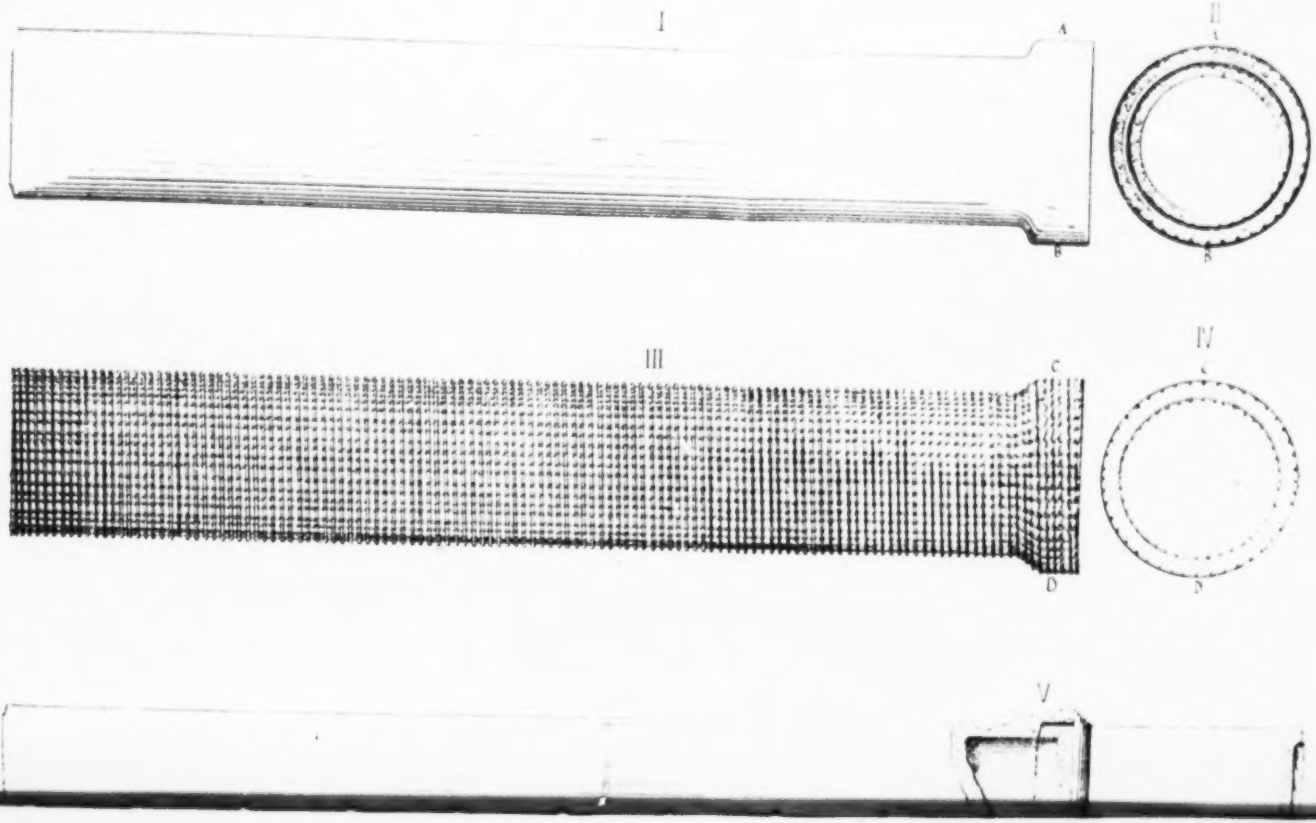
2nd figure—A metallic framework of a single piece, having male and female connections.

3rd figure—The assemblage of tubes by means of male and female connections and secured with cement.

The said tubes may be employed wherever they can be made use of, both in industry and commerce.

Signed, June 21, 1902.

JOSEPH PELLEGRIN.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DEFENDANT'S EXHIBIT AA-8.

(LIBRARY FEB 20 1894 U. S. Patent Office.)

Ausgegeben Den 11, Januar 1894.

KAISERLICHES PATENTAMT.

PATENTSCHRIFT

—Nr 73004—

Klasse 80: Thon- und Steinwaaren-Industrie.

ROBERT KIESERLING in HAMBURG und MAX MOLLER in ALTONA.

Verfahren zur Herstellung von Cementhohlkorpern aus Stampfbeton mit stufenweise eingeformtem Eisengerippe.

Patentirt im Deutschen Reiche vom 24. Marz 1892 ab.

In manchen Fallen ist es zweckmafsig, zur Erhohung der Festigkeit von Cementhohlkorpern in die letzteren Eiseneinlagen einzuformen, welche von der Cementmischung vollstandig umhullt werden. Sobald aber diese Eiseneinlagen, die ous Drahtgeflecht, Drahtgewebe oder einer Reihe fest mit einander verbundener Stucke bestehen konnen, gleich als ein Ganzes aufgestellt werden, was bisher ausnahmslos geschah, werden die Vorzuge, welche das stufenweise Einformen des Cementhohlkorpers besitzt, sehr beschrankt, weil das Einstampfen der Cementmischung in die Form haufig fast unausfuhrbar ist.

Um nun das Einstampfen der Cementmischung in die Form, den einzigen Weg, Hohlkorper von grofster Festigkeit und Gleichmafsigkeit im inneren Ge-

fuge zu erzielen, beibehalten und doch gleichzeitig den derart erzeugten Hohlkorper mit einem Eisengerippe versehen zu konnen, ohne das Einstampfen zu behindern, soll das nachstehend beschriebene Verfahren dienen.

Dasselbe besteht im wesentlichen darin, dafs das Eisengerippe aus einzelnen Theilen zusammengesetzt wird, die nach und nach, entsprechend dem Fortgange der eigentlichen Formarbeit, in Verbindung mit einander gebracht werden.

Da nun im Allgemeinen aus praktischen Grunden die das Einstampfen bewirkenden Mittel in senkrechter Richtung bewegt werden, so ist nachstehend, obwohl es ja auch denkbar ist, dafs von der Seite eingestampft wird, angenommen worden, dafs das einstampfende Werkzeug in senkrechter Richtungf auf- und abwarts bewegt wird. In dem Falle ist es angangig, die senkrecht oder annahernd senkrecht stehenden Thiele des Eisengerippes sofort als Ganzes aufzustellen, oder aber auch dieselben aus einzelnen uber einander liegenden Stucken nach und nach, dem Fortgange der Formarbeit entsprechend, zusammenzusetzen.

Dieses letztere Verfahren, welches fur die Herstellung von Hohlkorpern der verschiedensten Form und Grofse anwendbar ist, soll nunmehr an einem Beispiele erlautert werden. Im engen Anschlufs an das in der Patentschrift Nr. 73003 beschriebene Verfahren der Herstellung eines Cementrohres aus Stampfbeton soll nachstehend angenommen werden, dafs es sich wieder um die Herstellung eines Cementrohres, jedoch mit Eisengerippe, handelt.

Zur Herstellung desselben verfahrt man folgendermafsen:

Nachdem in den uber der Grundplatte und zwischen dem Kern und der untersten Ringschicht des Mantels bestehenden Hohlraum eine in ihrer Starke nach der Grofse des herzustellenden Rohres sich richtende Lage a der Cementmischung rings um den Kern eingestampft ist, wird auf diese Lage ein Ring *b* gelegt, der entweder aus einem Stuck oder auch aus mehreren mit einander verbundenen oder auch unabhangig von einander bestehenden Theilen gebildet ist. Dieser Ring *b* bezw. diese einzelnen von einander unabhangigen Stucke werden mit senkrechten Stutzen *c* versehen, die mit dem einen Ende unter den Ring geschoben und umgeschlagen werden, wie das in den Fig. 2 und 3 ersichtlich ist.

Die Verbindung der Stutzen *c* mit dem Ring *b*, sowie die Form dieser Stucke ist naturlich mannigfacher Abanderungen fahig, ohne dafs darum der Zweck derselben verfehlt wurde. Nachdem nun diese Stutzen, welche wegen ihrer im Verhaltnifs zur Dicke des Rohres aufserst mafsigen Starke das Einstempfen des Betons in keiner Weise hindern, sammtlich aufgebracht sind, wird der noch freie Hohlraum zwischen dem Kern und der ersten Mantelschicht bis an den Rand der letzteren fest mit der Cementmischung ausgestampft und darauf auf dis Betonoberflache bezw, die Stutzen *c* ein Ring *b*1 aufgelegt, der entweder schon mit Stutzen *c*1 versehen ist oder jetzt erst solche durch Unterfuhren und Umschlagen der Enden derselben um den Ring erhalt. Ehe nun die zweife Mantelschicht aufgebaut und

der zwischen derselben und dem Kern bestehende Hohlraum mit der Cementmischung ausgefullt wird, werden die aus dem eingestampften Beton herausstehenden Enden der Stutzen *c* mit dem von denselben getragenen Ring *b* in passender Weise, am einfachsten durch Umschlagen um denselben, verbunden. Darauf wird die zweite Mantelschicht aufgebaut und der von dieser Schicht einerseits, dem Kern und der Betonoberflache der ersten Lage andererseits begrenzte Hohlraum durch Einstampfen der Cementmischung bis an den oberen Rand der Mantelschicht ausgefullt. Nachdem dann ein neuer Ring *b*2 aufgelegt und mit Stutzen *c*2 versehen ist, werden die Enden der Stutzen *c*1, wie das vorher bei den Stutzen *c* und dem Ring *b* geschah, um den Ring *b*2 gebogen und die dritte Mantelschicht aufgebaut.

In dieser Weise schreitet die Bildung des Rohres sowie das Einformen des Eisengerippes vor, ohne dafs durch das letztere das Einstampfen des Betons in irgend welcher Hinsicht erschwert ware. Ist das Rohr ein muffenloses, dann wird der letzte Ring, der keine senkrechten Stutzen mehr erhalt, nicht in der Hohe der oberen Kante der letzten Mantelschicht gelegt, sondern einige Centimeter tiefer und in der alten Weise mit den unter demselben liegenden Stutzen verbunden. Der uber dem letzten Ring begende freie Raum der Form wird darauf ausgestampft und so erreicht, dafs das Eisengerippe von der Cementmischung allseitig umgeben ist.

Handelt es sich dagenen um die Herstellung eines Rohres mit Muffe, dann wird in gleicher Weise verfahren, jedoch aufserdem noch in Hohe des oberen

Randes jener Mantelschicht, welche etwa in der Mitte der Muffe abschliefst, eine Seitenstrebe *d* abgezweigt, welche eine oder auch bisweilen zwei Stutzen *e* tragt, die mit Ringen *f* in Verbindung stehen. Der letzte dieser Ringe besitzt naturlich auch keine Stutzen. Derselbe wird vielmehr nur von solchen getragen und steht wieder einige Centimeter unterhalb des oberen Randes der Muffe, so dafs also auch dieses Nebengerippe allseitig von dem Beton umgeben ist.

Von dem eben geschilderten Verfahren zwar etwas abweichend, mit demselben aber in dem oben dargelegten Pripcip ubereinstimmend, sind die in der Zeichnung noch veranschaulichten Verfahren.

In den Fig. 5, 6 und 7 ist in Seitenansicht und Grundrifs ein Eisengerippe dargestellt, dessen senkrechte Stutzen *g* aus einem oder auch mehreren mit einander verbundenen Stucken bestehen konnen. Diese Stutzen sind je mit einer Reike von Aussparungen versehen, in welche ein Draht *h* liegen kommt, welcher spiralformig auf die Stutzen, dem Fortgange der Formarbeit entsprechend, gewickelt wird. Die in 7b und 7c gegebenen Ausfuhrungsformen empfehlen sich insofern, als bei Beanspruchung des Rohres auf Zug dre Draht nach beiden Richtungen hin ein Widerlager findet, was bei der durch die Fig. 5 und 7a veranschaulichten Ausfuhrungsform nicht der Fall ist. Das in den Fig. 8 bis 11 dargestellte Eisengerippe bedarf hinsichtlich seiner Herstellung keiner weiteren Erlauterung.

Das in der Patentschrift Nr. 73003 beschriebene Verfahren und das vorliegende gleichen sich insofern

aufserordentlich, als dort Theile der Form so lange fortgelassen wurden, bis dieselben unbedingt benothigt wurden; dasselbe geschieht hier mit den einzelnen Theilen des Eisengerippes. Die Vorzuge des Verfahrens liegen, abgesehen davon, dafs das nicht genug zu schatzende Stampfverfahren beibhalten werden kann, darin, dafs durch das Eisengerippe nicht allein die Festigkeit des Hohlgegenstandes wesentlich erhoht wird, sondern auch der Cement vor und wahrend des Abbindens einen vorzuglichen Halt gewinnt, so dafs das Abbrechen des Mantels sowohl als des Kernes sowie das Fortschaffen des Rohres von der Grundplatte fruher geschehen kann, als das bei Herstellung der Rohre nach dem in der erwahmen Patentschrift beschriebenen Verfahren der Fall ist.

PATENT-ANSPRUCH:

Bei dem im Patent Nr. 73003 beschriebenen Verfahren zur Herstellung von Cementhohlkorpern aus Stampfbeton ein stufenweise eingeformtes Eisengerippe, dessen Aufbau in der Weise erfolgt, dafs jene Theile desselben, welche parallel oder annahernd parallel zur Bewegungsrichtung des einstempfenden Werkzeuges liegen, ganz aufgebaut oder allmalig vervollstandigt werden, wahrend die diese Theile durchkreuzenden Stucke des Eisengerippes entsprechend dem Fortgange der Formarbeit eingefugt werden, zum Zweck ungenhinderten Einstampfens des Betons in die Form.

German Patent.

Translation of German Patent No. 73,004—Robert Kisserling of Hamburg and Max Moller of Altona.

The Processes for the Production of Hollow Concrete Bodies With Progressively Formed Steel Reinforcements Therein.

In certain cases it is necessary, in order to increase the rigidity of hollow concrete bodies, to form therein steel reinforcing members which are substantially entirely surrounded by the mixture of concrete. As soon, however, as these reinforcing members, which may consist of interwoven wire or of a series of bars tied tightly to one another, are set up as a unit, which heretofore was the procedure witout exception, the advantages which the progressive formation of the concrete hollow body possesses, are very much diminished, since the tamping of the concrete mixture into the form is made practically impossible thereby.

Hereinafter is described the process in which is carried out the tamping of the concrete mixture into the form (the only way to attain hollow concrete bodies of maximum solidity and uniformity in the inner layers thereof), and in which, at the same time, the hollow body thus produced, is provided with steel reinforcement, without preventing the tamping of the concrete.

The process consists essentially therein that the steel reinforcement is built up of single parts which

are gradually, according to the progress of the construction, brought into connection with one another.

Since, for practical reasons, the means employed in tamping the concrete are actuated in a vertical direction, it will be assumed, therefore, although it is also conceivable that the tamping may proceed horizontally, that the tamping apparatus is actuated reciprocally in a veritical direction. In such a case it is possible to set up at once in whole, the vertically or nearly vertically extending parts of the reinforcement, or it is possible also to gradually build up the latter of single parts superimposed vertically one over the other, according to the progress of the work.

This last procedure, which is applicable in the production of hollow bodies of the most varied forms and magnitude is now to be disclosed in connection with a typical example. In the brief review of the process for producing a concrete pipe, as described in the patent No. 73,003, it is to be hereinafter assumed that it is again a question of production of a concrete pipe, with, however, steel reinforcement therein.

For the production of the latter, the process is substantially as follows:—After a layer of concrete has been tamped about the core and immediately over a base plate and in a space between the core and the lowermost annular section of the mold, the thickness of which layer is in proportion to the size of the pipe to be made, there is laid upon this layer a ring *b* which consists of either one part or of several parts, either inter-connected or even, also, independent of

one another. This ring *b*, or according to circumstances these individual and independent parts are provided with vertically extending studs *c* which at the one end thereof are placed under and bent around the ring as is illustrated in Figs. 2 and 3.

The connection between the studs *c* and the ring *b*, as well as the form of these parts is entirely susceptible to various possible embodiments without departing from the purposes thereof. After these several studs have been applied, which by reason of their substantially small cross section in comparison to the thickness of the pipe itself do not prevent the tamping of the material in any manner whatsoever, the space between the core and the first section of the mold is filled with concrete up to the edge of the latter and the concrete tamped, and there is laid either upon the concrete surface or, according to circumstances upon the studs *c*, a ring *b*1, to which there are already applied studs *c*1 or there are now applied such studs thereto by bending the ends thereof about the ring. Before, now, the second section of the mold is applied and the space between that and the core is filled with the concrete mixture, the studs *c* protruding through the tamped concrete are connected with the ring *b*1 in a convenient manner, preferably by bending, which ring is carried by the studs *c*. Thereupon the second mold section is applied and the space between the latter, the core, and the concrete surface and the layer, is filled with concrete up to the upper edge of the mold section and tamped. After a new ring *b*2, has been applied provided with studs *c*2, the ends of the studs *c*1, as was the case

with the studs *c* and the ring *b*, I now bend about the ring b^2 and the third mold section thereby built up.

In this manner the formation of the pipe as well as the construction of the steel reinforcement proceeds, without, however, that the latter interferes with or makes difficult the tamping of the concrete in any manner whatsoever. If the pipe is to be without a coupling flange, then the last ring, to which there are attached no upright studs, is not laid at a level corresponding with that of the edge of the last mold section, but is placed several centimeters lower and is connected with the studs extending immediately thereunder in the manner heretofore described. The space immediately over the last ring is now filled and tamped with concrete so that the reinforcement is entirely surrounded on all sides by the concrete mixture.

If it is a question of constructing a pipe with a coupling flange, then the process is carried out in the same manner, but there is branched off a side strut *d* at the height of the upper edge of that mold section which terminates about at the center of the coupling, which side strut has mounted thereon one or two studs *e* which are connected with the rings *f*, the last of these rings has naturally no studs mounted thereupon. The latter is moreover carried by such studs and is several centimeters below the upper surface of the coupling flange, so that therefore this laterally extending reinforcement is complete surrounded by the mixture.

Departing from the above described process, but

combining therein the above described principle, there are described in the drawings various further embodiments of this invention.

In Figs. 5, 6 and 7 there is illustrated, in side elevation and in cross section, such a steel reinforcement, whose upright studs *g* may consist of one or more interconnected parts. These studs are provided with a series of notches, which are adapted to receive a wire *h*, which is wound upon the studs spirally as the construction progresses.

In Figs. 7b and 7c, are shown advantageous embodiments, in which the wire *h* is connected with the studs so as to be capable of resistance in both directions, which is not the case in the embodiments illustrated in Figs. 5 and 7a. The reinforcing structure shown in Figs. 8 to 11 requires, in view thereof, no further disclosure.

The processes described in the patent No. 73,003 and the processes herein disclosed, are extraordinarily similar insofar as in the former, the sections of the mold are left off until they were absolutely necessary; the same is the case here with the single parts of the steel structure. The advantages of the processes aside from the fact that the tamping, which cannot be given too much emphasis, can be retained, lie not only in the fact that the rigidity of the whole structure essentially is increased by reason of the reinforcement, but also in the fact that the cement both before and during the setting thereof, attains an advantageous density, so that the dissembling of the mold and the core as well as the removal of the pipe from the base plate itself, can take place much

sooner than in the construction of pipes according to the processes desribed in the above mentioned patent.

Claim:

The processes for the production of hollow concrete bodies, as described in patent No. 73,003, of "material adapted to be tamped" a steel reinforcement formed therein progressively, whose construction takes place in such a manner that such parts thereof, which lie parallel or nearly parallel to the direction of actuation of a tamping apparatus, are either built up or eventually completed, while the parts of the reinforcement extending through said first parts are inserted as the construction proceeds, for the purpose of allowing the free tamping of the material into the mold.

ROBERT KIESERLING IN HAMBURG UND MAX MÖLLER IN ALTONA

Verfahren zur Herstellung von Cementhohlkörpern aus Stampfbeton mit stufenweise eingeformtem Eisengerippe.

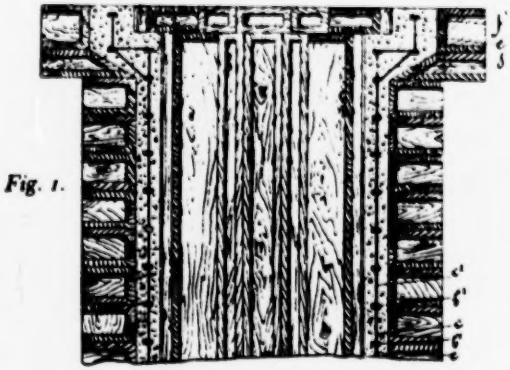


Fig. 1.

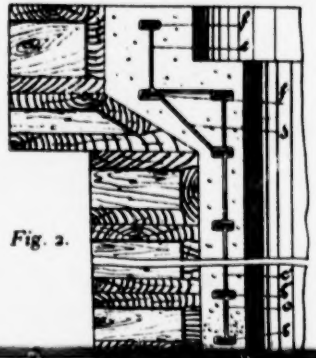


Fig. 2.

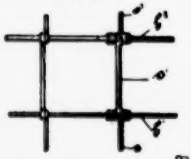


Fig. 3.

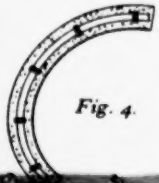


Fig. 4.

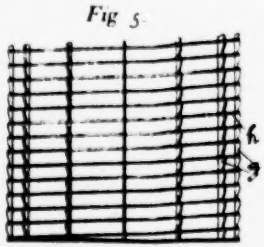


Fig. 5.

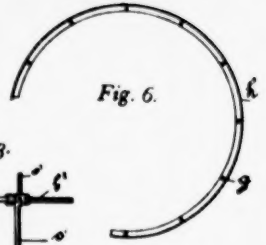


Fig. 6.

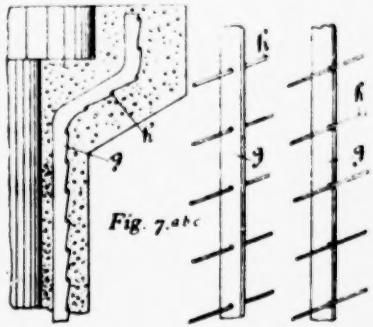
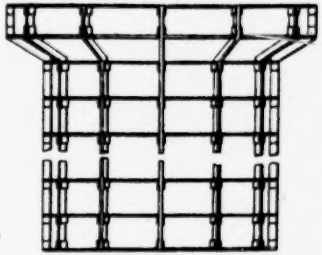


Fig. 7. a b c

Fig. 8.



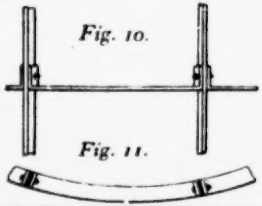


Fig. 10.

Fig. 11.

Fig. 9.

DEFENDANT'S EXHIBIT AA-11.
2—112

DEPARTMENT OF THE INTERIOR.
UNITED STATES PATENT OFFICE.

Manuscript and Photolithograph Division.
Apr 17 1917

CONFEDERATION SUISSE
BUREAU FEDERAL DE LA PROPRIETE
INTELLECTUELLE

EXPOSE D'INVENTION

(Library Nov 21 1904 U. S. Patent Office)
20 novembre 1903, 7 h. p.

Brevet No 29781 Classe 5

S. de MOLLINS, a Lausanne (Suisse).

Piece de construction en beton frette et arme.

On a donne le nom de pieces en *beton frette* a des pieces de construction en beton, dans losquelles sont noyees des helices metalliques enveloppant une portion cylindrique de la masse du beton, et on appelle pieces en *beton arme* des pieces munies de barres longitudinales placees dans les parties de la piece qui sont soumises a des efforts de tension. Il est d'uatre part a remarquer que les pieces en beton frette sont fort difficiles et couteuses a etablir a cause des grandes difficultes pratiques qu'il y a

L'objet de la presente invention est une piece de noyer dans le beton une helice metallique continue.

construction en beton, dans laquelle le frettage est obtenu non plus par une helice continue mais par des cercles paralleles qui sont d'un maniement facile et economique au chantier. Cette piece est en outre munie de barres longitudinales destinees a resister aux efforts de tension, c'est-a-dire d'augmenter la resistance de la piece au flambage.

Le dessin ci-joint, donne a titre d'exemple, montre deux formes d'execution de l'invention.

La fig. 1 est une vue en perspective d'une piece de construction dont le beton est enleve sur une partie de la longueur pour laisser voir l'armature a frettes circulaires;

La fig. 2 est une coupe transversale de l'armature montree en fig. 1;

La fig. 3 montre en coupe transversale une autre forme d'armature a frettes circulaires;

Les fig. 4, 5 et 6 montrent a plus grande echelle une piece d'attache reliant un cercle et une barre.

a sont des cercles qui peuvent par exemple etre formes par des fils metalliques de longueur convenable ayant leurs extremites soudees ou attachees, et qui sont disposes parallelement les uns par rapport aux autres et fixes par des attaches *b* aux barres longitudinales *c*.

Les fig. 1 et 2 montrent que ces dernieres peuvent etre plus rapproachees les unes des autres par place, suivant les efforts de tension que l'on doit prevoir dans l'ouvrage.

Comme on le voit fig. 4, 5 et 6 chaque piece d'attache *b* forme un etrier entourant une barre *c* du cote oppose a celui ou un cercle *a* sappuie contre cette

derniere et dont les bouts sont replies par dessus ledit cercle *a* de chaque cote de ladite barre *c*.

Les pieces d'attache *b* (ou etriolets) relient solidement la zone de tension de la piece de construction a sa zone de compression, ce qui permet a la piece de construction en beton frette et arme de resister avec succes aux efforts de flexion aussi bien qu'a ceux de compression.

Resume.

1 Piece de construction en beton frette et arme, caractrisee par des cercles disposes parallelement les uns aux autres et enveloppant une portion cylindrique de la masse de beton et par des barres longitudinales destinees a resister aux efforts de traction;

2 Piece de construction telle que revendiquee sous chiffro 1, dont let cercles sont relies avec les barres longitudinales par des pieces d'attache metalliques;

3 Dans une piece de construction telle que revendiquee sous chiffre 1 et 2, des pieces d'attache telles que representees aux fig. 4 a 6 du dessin.

S. de MOLLINS,
Maudataire: E. IMER-SCHNEIDER, a Geneve.

SWISS CONFEDERATION.

Federal Bureau of Intellectual Property.

STATEMENT OF INVENTION.

Patent N. 29781. Nov. 20, 1903, 7 p. m. Class 5.

S. de Mollins, Lansanne (Switzerland).

Building Element of Hooped Concrete.

Hooped concrete is the name given to those building members of concrete in which the metal helices which enveloped cylindrical portions of the mass of concrete are embedded, and the name of armored concrete to those members provided with bars placed longitudinally in those parts subjected to tension stresses. On the other hand, it is to be noticed that the members of concrete are very difficult and expensive to produce because of the great practical difficulty that there is to embed a continuous metallic helix in the concrete.

The object of the present invention is a concrete building member in which the hooping is obtained not only by a continuous helix but by parallel rings which are easy to handle and economic to store. This member is also supplied with longitudinal bars intended to resist tension stresses, that is to say, to increase the resistance of the member to buckling.

The accompanying drawing, given as an example, shows two methods of embodying the invention.

Fig. 1 is a perspective view of a building member

in which the concrete is broken away for part of the length for the purpose of permitting the circular hooped reinforcements to be seen.

Fig. 2 is a transverse section of the reinforcement shown in Fig. 1.

Fig. 3 shows a transverse section of another form of reinforcement of circular hoops.

Figs. 4, 5 and 6 shows an attaching device to connect a ring and a bar, on a larger scale.

a are the rings which may have been formed, for example, by metal wires of convenient length having their ends soldered or connected, and which are disposed parallel to each other and connected by the attachments *b* to the longitudinal bars *c*.

Figs. 1 and 2 show that these last may be closer together, following the tension stresses, which should be provided for in the work.

As seen in Figs 4, 5 and 6 each connector *b* forms a stirrup clasping a bar *c* at the side opposite to that where a ring *a* is supported against it, the ends of the connectors being bent around said rings *a* on each side of said bar *c*.

The attachments *b* (or little stirrups) solidly unite the zone of tension of the building element to the zone of compression which permits the building element of armored and hooped concrete to successfully resist the flexing stresses as well as those of compression.

Resume.

1. A building element of armored and hooped concrete characterized by rings disposed parallel to each

other and enveloping a cylindrical portion of the mass of concrete and by longitudinal bars which are intended to resist tensioned stresses.

2. A building element such as claimed in number 1, in which the rings are attached to the bars by means of metal connectors.

3. In a building element such as claimed in numbers 1 and 2, connectors such as are represented in Figs. 4 to 6 of the drawing.

S. de MOLLINS.

Attorney, E. IMER SCHNEIDER, at Geneva.

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Brevet N° 29781.
1 feuille.

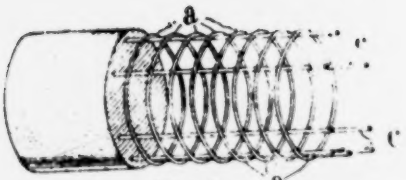


Fig.1

Fig.2.

Fig.3.

Fig.4.

Fig.6.

Fig.5.

DEFENDANT'S EXHIBIT II.
2—112

DEPARTMENT OF THE INTERIOR.
UNITED STATES PATENT OFFICE.

Manuscript and Photolithograph Division.
Apr 17 1917

SCHWEIZERISCHE EIDGENOSSENSCHAFT
EIDGEN. AMT FUR GEISTIGES EIGENTUM
PATENTSCHRIFT

(Library U. OCT 8 1906 S. Patent Office)

Patent Nr. 19271 Klasse 5
2. Februar 1900 4¼ Uhr p.

Max MUNCH, in Bern (Schweiz).

Neuartiger Fachwerktrager als Einlage fur tragende Bauteile aus Beton, Ziegelmauerwerk etc.

Gegenstand vorliegender Erfindung ist ein Fachwerktrager, welcher als Einlage fur tragende, aus Beton, Ziegelmauerwerk etc. gebildete Bautiele, z. B. Balken, Decken, Wande etc., dient. Auf beiliegender Zeichnung ist der Erfindungsgegenstand in mehreren beispielsweisen Ausfuhrungsformen durch die Fig. 1-5[a] dargestell.

Derselbe ist bei den durch die Fig. 1-1[a] und 2-2[a] dargestellten Ausfuhrungsformen gebildet aus einer untern Gurtung *a* und einer obern Gurtung *b*, um welche beiden Gurtungen ein aus Metall bestehendes Konstruktions-material (z. B. Rundeisen, Bandeisen,

Drahtseil etc.) in solchem Verlauf geschlungen ist, daf die zwischen den beiden Gurtungen *a* und *b* befindlichen Teile dieses Konstruktions-materials Fullungsglieder *c* bieten, welche bei eingamauertem Trager Spannungen aufzunehmen und zu ubertragen im Stande sind.

Bei den durch die Fig. 3-3ª and 4-4ª veranschaulichten Ausfubrungsformen des Fachwerktragers, bei welchem die Enden der beiden Gurtungen *a* und *b* miteinander verbunden sind, sind zur besseren Ausbildung der Knotenpunkte noch quer zur Fachwerksebene liegende Knotenpunkverstarkungsglieder *d*, vorzugsweise aus Gufeisen oder Walzeisen (z. B. auch in Rohrenform), angeordnet.

Das zur Bildung der Fullungsglieder r dienende Konstruktionsmaterial kann auch, wie z. B. in Fig. 5 und 5ª dargestellt, mehrfach um die beiden Gurtungen *a* und *b* ge schlungen sein; auch konnen Fullungsglieder mit Verstarkungen *e* versehen sein (Fig. 5). Statt in einem Strang kann das zur Bildung der Fullungsglieder *c* dienende Konstruktionsmaterial auch in mehreren Strangen um die beiden Gurtungen geschlungen sein.

Zur Bildung der Gurtungen, welche gerade, gebogen etc. sein konnen, kann man Rundeisen, Flacheisen, Faconeisen, Drahtseile, Ketten etc. verwenden.

Patent-Ansperuche:

1. Fachwerktrager als Einlage fur tragende Bauteile aus Beton, Ziegelmauerwerk etc., gekennzeichnet durch eine untere und eine obere metallene Gurtung, um welche ein zur Bildung von Fullungsglie-

dern geeignetes metallenes Konstruktionsmaterial in einem Strang oder in mehreren Strangen in solchem Verlauf ein- oder mehrfach geschlungen ist, daf die zwischen den Gurtungen befindlichen Teile dieses Konstruktionsmaterials Fullungsglieder bieten, welche bei eingemauerten Trager Spannungen aufzunehmen und zu ubertragen im Stande sind;

2. Fachwerktrager nach Anspruch 1, bei welchem zur besseren Ausbildung der Knotenpunkte quer zur Fachwerkebene angeordnete Knotenpunktverstarkungsglieder angebracht sind;

3. Fachwerktrager nach Anspruch 1, bei welchem Fullungsglieder mit Verstarkungen versehen sind.

Max MUNCH.

Vertreter: C. HANSLIN & Co., in Bern.

PATENT No. 19,271.

MAX MUNCH, Bern, Switzerland.

A NEW IDEA FOR BEAMS.

A reinforcing for load supporting beams of concrete, brick work, etc.

The above mentioned invention being for beam support, having as a filler in concrete or brick work, walks, etc.

The design is illustrated in figures 1-5a, figures 1 and 1a, 2 and 2a illustrate this principle in the form of an upper and lower girder; having metal (round iron, band iron, wire, etc.) wrapped in such a manner as to act as a filling support or reinforcing so that the girder may be taken up and moved. Figures 3 and 3a, 4 and 4a, illustrate this principle in a more elaborate form:—with the ends (of the girders) connected. Figures d . . . d are cross rods or tubes, around which the wrapping material is slung as in 3a and 4a offering additional strength at these points. This wrapping material may be multiplied indefinitely, or more strands may be used.

In the construction of girders which may be straight, bent, curved or otherwise—round iron, band iron, iron of special design, wire, chain, etc., may be used.

Claims.

1. A type of beam, construction for use in concrete, brick work, etc., specified as an upper and lower metal girder, having one or a number of strands

of material, as hereinbefore stated, wrapped in such a manner that when filled with the binding materials the beam may be moved and put into place.

2. Beams as per 1, having in addition cross members to give additional strength at the tie points.

3. Beams as per 1 wherein the wrapping material has been reinforced.

P. T. O.

Max Munch.
2. Februar 1900.

Patent Nr. 19271.
1 Blatt.

EXPERIMENTAL RESEARCHES

ON

REINFORCED CONCRETE

BY

ARMAND CONSIDERE
Ingenieur en Chef des Ponts et Chausees,
TRANSLATED AND ARRANGED

BY

LEON S. MOISSEIFF, C. E.
Assoc. Mem. Am. Soc. C. E.

WITH AN INTRODUCTION

BY

THE TRANSLATOR

AUTHORIZED EDITION

NEW YORK
McGRAW PUBLISHING COMPANY
114 LIBERTY STREET
1903

15. Types of Hooped Concrete.

The good results of hooped concrete depend on the proper arrangement of the hooping. It is evident at the start, that the hoops must be well locked and that they must not open under the internal pressure of the concrete. If the inclosing reinforcement is made of other material than metal, the stresses which it produces in the concrete must not injure its resistance to compression endwise, which is its main stress. The experiments reported earlier in this chapter have also proved that the hoops must be near to each other to give to the concrete a satisfactory coefficient of elasticity and column resistance. To duly appreciate the degree of regularity required for the spacing of the hoops a distinction should be made between the crushing resistance and the elasticity on which the column resistance depends. It has been shown that hooped prisms always have a considerable excess of crushing resistance. It will, therefore, not impair the crushing resistance if the spacing of the hoops is not very regular. Of course, too much irregularity should be avoided and the omitting of a hoop, for instance, would prove dangerous. For the elasticity and column resistance the regularity of the spacing must not necessarily be perfect. The deformations measured over sufficient lengths depend on the average spacing for the modification of the column resistance.

Hoops of two completely different types may be used. One type consists of independent hoops, the other of continuous helicoidal spirals made of

wire or rods as long as possible. If independent hoops are employed each one must be locked so strongly as not only not to open under the internal pressure of the compressed concrete, but also not to show any appreciable deformation in its connections. Practically it is impossible to connect the countless hoops which an important structure would contain. This has never even been attempted and it is generally limited to giving the ends of each rod an excess of length which overlaps and locks by the adhesion of the metal to the concrete. The ends can be tied together if the wire is of small gauge, but this is not good practice in all cases and is almost impossible with thicker rods. The introduction of the adhesion to the concrete causes a stress which can in nowise be neglected and which is produced near the circumference of the compression members where the pressure and the tendency to flexure require all the resistance that can be afforded. In addition it must be remembered that the regularity of spacing of the independent hoops is dependent on the care and attention of the workmen, on which it is impossible to count.

These inconveniences are avoided by the use of long wires or rods bent into helicoidal spirals. Drawn wires of great resistance can be obtained up to ½-inch diameter and steel bars ⅝-inch thick can be obtained in coils 160 feet long. The thickest bars that may be required for hooping can be bought in coils at least 80 to 100 feet long. With such lengths 10 to 40 spirals can be made continuous. To insure the transmission of the tension from one bar to another

it is sufficient to embed between the last spirals of one bar the first spiral of the next and to curve in toward the center of the section the ends of the bars bent into crooks. The additional stress thus caused in the concrete acts in the central portion of the concrete where, being supported by the pressures acting in every direction and having a considerable excess of resistance, there is no danger. Experience has plainly proved the efficiency of this procedure. It could not be well used for independent hoops where the too numerous ends would crowd the section. When spirals have to be made for given prisms, an endeavor should be made to find the diameter and pitch which the metal, when left to itself, will retain, owing to its elasticity. Experience has shown that this is not difficult. The spirals once made and checked, no important errors can occur while putting them in place and concreting.

It would seem that, since the elastic efficiency of the hooping increases with the closeness of the hoops, at least within certain limits, the ideal will be reached by the use of continuous tubes; but such is not the case for several reasons. The external layer of concrete which is necessary for the protection of the tube will crack off as do all covers applied to surface subject to high stresses. The tube would generally be riveted and pierced by numerous holes which would reduce its resistance not only by reducing the section, but frequently also by punching defects. In addition to these practical objections a fundamental objection must be taken into account. It has been seen that the metal of the hoops can re-

sist the considerable deformations of the hooped prisms because its elongation is only a small fraction of the longitudinal shortening. It is far below its elastic limit while the reinforcing parallel to the axis already exceeds it. The longitudinal shells would be in the same condition as the longitudinal reinforcing rods. They would be stressed the same as these and would spread laterally the same as the concrete itself and would thus not be able to prevent its swelling. Concluding, it may be stated that independent rings show serious difficulties which increase with their closeness and the sizes of the iron used for them. Continuous shells, on the other hand, have little efficiency and are exposed to atmospheric action. The best type of hooping thus appears to be helicoidal spirals of suitable dimensions.

For the reported experiments a single volution was used which was cut by a plane perpendicular to the longitudinal axis in a single point. Two modifications of the same may be used. One consists in having two or three wires, instead of one, wound in a spiral doubling or tripling at the same time the pitch of the screw so as to maintain the same spacing of spirals. This can be done if it is not desired to rely on a single wire, though it has not been worked otherwise than by bending it in the spiral shape. The other modification consists in giving to the spirals different diameters, instead of the same for all, and having the direction of the spirals in the opposite direction. This would prevent any torsional tendency in the concrete, but torsion is

evidently out of question in the structures discussed. From the above the author concludes:

To give to concrete a high ductility and to increase at the same time to a high degree its elastic limit and crushing as well as column resistance, the hooping must form close loops and have the least number of joints. These conditions lead to the use of helicoidal spirals combined with longitudinal rods forming a continuous skelton which resists efficiently the transverse swelling of the concrete.

16. The Method of Manufacture of Compression Members.

Hooped concrete, the same as concrete-steel generally, will take many forms and have many applisations which will determine the methods of its construction. Nothing general can be said on this subject, and the following remarks apply only to columns or compression members of sections approaching to circles and intended to resist pressures endwise.

The importance in such members of elastic symmetry, that is, of the equality for the values of the coefficient of elasticity and the elastic limit at different points of the same section is easily understood. The lack of symmetry causes curving and invites flexure. But it is practically impossible to obtain elastic symmetry in members concreted while lying longitudinally, as it is seen at once that there must exist differences between the upper and lower layers as to tamping and distribution of water, cement, sand, and stone. By examining and

sounding with a hammer different parts of a member appreciable differences can almost always be noticed in the compactness. This consideration tends to the adoption of vertical moulding for members compressed endwise; but it should be noted that this does not apply to beams whose horizontal layers are subjected to different stresses. For them the sum of their moments only is of importance and not the distribution over the section.

Vertical moulding has also other advantages. It tends to place the stones with their flat sides perpendicular to the direction of the pressure, the same as in well built masonry. Horizontal moulding, on the contrary, places them in the most unfavorable position. The concrete being better confined in vertical moulds than in horizontal, tamps more quickly and much better. In members reinforced by hoops and longitudinals pressing against the inner surface of the hoops the whole central portion is free for vertical ramming, and the tamping tool can strike the concrete without shaking the reinforcing and disturbing the previously tamped portions. If members which are to be built in a different position are moulded vertically they get the advantage of being made in improved moulds provided with stops for the spacing of the spirals and in a covered shop protected from the rain, which is dangerous during moulding, and the sun which is not less dangerous during the early time of setting. Thorough inspection in a shop is easy and only a small number of selected workmen are required. For complete safety all members should be carefully examined and their

quality judged by sounding with a hammer, which gives valuable information to the experienced man, and by weighing from which the density of the member could be computed and which would add additional information on the character of the concrete. Indeed, for a concrete of a given proportion the elastic limit and the resistance vary in the same sense as the density and are in proportion to the intensity of the sound. Members not up to the standard could then be rejected.

Vertical concrete members can be taken out of the moulds at the end of six days. The same moulds can then be used over again many times. Beginning sufficiently early with the making of the members, they will

DEFENDANT'S EXHIBIT V.

IN THE

DISTRICT COURT OF THE UNITED STATES

FOR THE WESTERN DISTRICT OF PENNSYLVANIA.

GEORGE E. VANDENBURGH, vs. ELECTRIC WELDING COMPANY.	No. 127. May Term, 1917. In Equity.

STIPULATION.

It is stipulated and agreed that the attached translation of Sections 338, 339 and 340 of the book entitled Le Beton Arme by Paul Christophe, translation made by Horace R. Thayer, may be taken for the purposes of this case as a correct translation of the aforesaid portions of the said book and that the said attached translation may be substituted for defendant's exhibit 00.

EDWARD A. LAWRENCE,
Solicitor for Plaintiff.

FRED'K W. WINTER,
Solicitor for Defendant.

TRANSLATION FROM LE BETON ARME.

By PAUL CHRISTOPHE, pp. 337-341—Paris, 1902.

Translation of Defendant's Exhibit V.

#338. Mr. Bordenave of Paris, a maker of reinforced concrete pipes, and one of the first to employ the new process (See Chap. 1, No. 5) has devised a special system which he has named "Sidero-cement" (See No. 56). It is particularly designed for water pipes. In important instances it has been applied to diameters of 10 to 32 inches and to heads not exceeding 82 feet.

The reinforcement of the "Sidero-cement" pipes (Figs. 634-635 and Figs. 638-639) is formed of small special double Tee sections, curved in spirals, and wired together at intersections with inside straight bars of similar cross section.

Ten sections are employed for these special steel bars varying from 5/16" x 1/8" x 1/16" (approx.) to 1" x 7/16" x 3/32", with a weight per foot running from .084 H. R. T. to .58 pounds.

The pipes are cylindrical. The joints are made by means of a ring constructed in the same manner as the pipes (Figs. 636-637 and Figs. 638-639). The space of 3/8" to 1" between the heads of the two pipes, and that between pipes and ring is filled with cement mortar. The Bordenave system is applicable to egg shaped sewers and ordinary canals of every form as well as to circular conduits.

#339. CONDUITS AT BONE. In 1893, and 1895-6, M. Bordenave built several sections of re-

inforced pipe at Bone, Algiers, with a total length of 22 miles. They were used to furnish the city with drinking water. This diameter was 23½ inches and they withstood pressure varying from 26.4 to 84 feet.

The reinforcing steel is 1/2" x 3/16" x 1/16" weighing .15 lbs. per ft. For a pressure of 47 feet, the thickness of the pipe is 1-9/16"; the guide spirals are spaced 3-1/4" apart. For a head of 78 feet, the thickness is increased to 1-3/4"; and the spiral spacing is reduced to 1-15/16". In both cases the spacing of the longitudinal is 3-1/4 inches.

#*340.* THE BONNA SYSTEM. Mr. Bonna, a Parisian engineer, is the inventor of a system of construction of reinforced concrete pipes closely resembling the "Sidero-cement." Like the latter, the Bonna System is designed for the construction of water pipes under pressure. In this kind of work he has solved some very difficult problems. The diameter of the Bonna pipe has reached 71 inches; the head has been as high as 328 feet.

The reinforcement is formed of steel with a cruciform cross section. The principal bars, situated on the outside, are independent circular hoops or spirals. These bars are wired together or the wiring may be omitted; the longitudinals then carry upon their exterior faces, notches regularly spaced to receive the bases of the hoops. On the other side they are held in place by supplementary rings placed inside and about 39 inches apart.

As has been said above (No. 335), the pipes of reinforced concrete should be covered with a water

proof coat when the pressure exceeds a certain limit. In the Bonna system, this cover is made of lead covered sheet iron, or thin plain iron plates, the strength of which is not taken into account in calculating the frame or skeleton of the pipe. This waterproofing can simply form an interior lining (No. 341), but in order to protect it from the water, it may be imbedded in the cement. In that case it is surrounded by two sets of reinforcement, one inside, the other outside (No. 342). The latter only is considered in calculating the strains.

In certain cases the cement itself should be protected against the action of water. For some conduits carrying filthy or acid industrial water, Mr. Bonna puts in the interior of the pipes a glass tube in short sections connected with putty. In order to allow this tube to withstand a given pressure without breaking, it is cut with a diamond lengthwise. Instead of glass, enamelled sheet iron, ebonite or tar paper may be used. In certain cases it is sufficient to paint the interior of the pipes with a composition varied according to the results sought.

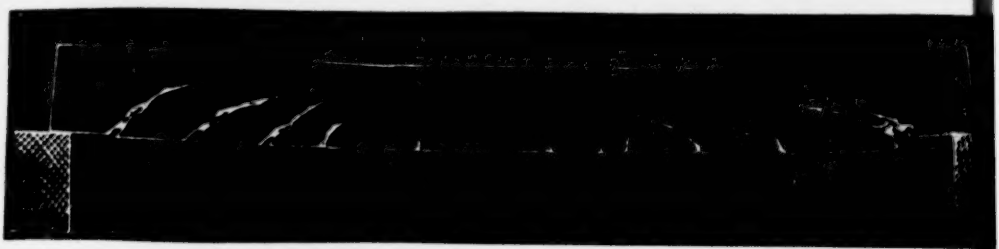
As in the Bordenave system, the Bonna pipes are constructed of cylindrical sections which are assembled by the aid of rings constructed like the pipes themselves.

A correct translation made by me.

HORACE R. THAYER.

FILED
JUL 9 1920

Also, when a reinforced concrete bar is subjected to a load, the tendency of the concrete, with its weak tensile strength to fracture is on certain lines of obliquity as indicated in the following cut of such a bar breaking under pressure.



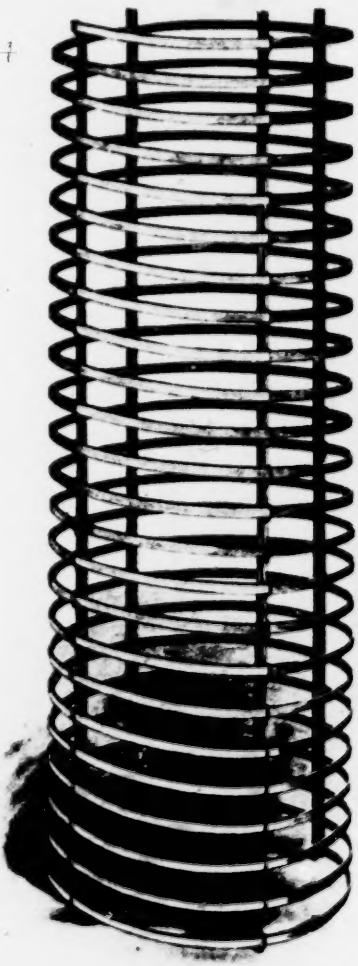
If there be attached to the main reinforcing bar, minor or subsidiary bars, extending into the concrete themselves obliquely but in a line substantially across the line of obliquity in fracture, such minor bars resist this tendency to fracture and strengthen the bar in that respect as well as protect the main bar against shearing or slipping lengthwise in the concrete. This action of minor or subsidiary bars obliquely connected with the main bar is designated as a "truss" action, because of its parallel in its supporting action to the common truss of engineering as illustrated in the ordinary truss bridge construction.

A steel bar or rod used in concrete reinforcing, whether a single rod, or a rod having minor or subsidiary rods attached thereto is well known and immediately recognized in reinforced concrete engineering by the term "reinforcing bar." This meaning of the term "reinforcing bar" should be kept in mind because of its use

No. 500
Defendant's Exhibit
No. 5
424
FILED
JUN 9 1920

KAHN SYSTEM OF REINFORCED CONCRETE

To simplify the assembling of hooped column reinforcement this Company has devised and carries in stock a spacing bar, as shown in the accompanying cut. This spacing bar is provided with a projecting rib, which is sheared from the main section to form projecting fins. The spacing of these fins corresponds to the standard pitch of the hooping bands and when bent around the bands, spaces and holds the hooping in exact position.



Hooping material is carried in stock in two sizes, namely ¼" by ½" bands and No. 0 wire. This material is rolled at the shops to various diameters and the proper number of coils in a continuous piece can be supplied when the pitch and story height are known.

In assembling the reinforcement for a hooped column, four or more spacing bars are placed on a circular form, with the fin side outward. The hooping is then slipped on and each band is placed so that the fins can be bent around it and hold it rigidly in position. The longitudinal reinforcing bars are then placed inside the core and wired to the shell at three or more points. The entire reinforcement for the column is then placed as a unit in the work.

DEFENDANT'S EXHIBIT X

425

Design for a Reinforced Concrete Column Without Patented Features.

Sir: There is a tendency to regard the field of reinforced concrete as quite monopolized by the firms using certain "systems" or patented bars, when equally as good results may be obtained by the use of simple structural shapes. The enclosed sketch for a concrete-steel column designed by the writer gives point to the foregoing.

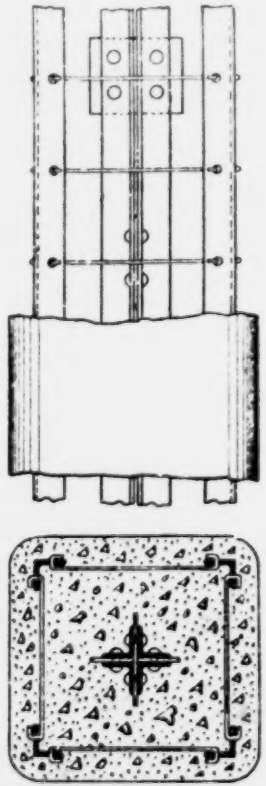
The angles at the corners effectually prevent lateral flexture, and should be properly proportioned to resist the moment due to eccentric loading. An effective bond is secured by the introduction of the wire ties, which serve also to bind the column together and to resist the shear. The angles at the center may be omitted if the load be not too heavy to exceed the crushing strength of the concrete, or may be made as heavy as desired, since the concrete supports it in such a manner as to secure the full crushing force of the steel. The batten plates, together with the rivet heads, form an excellent bond.

A column 16 ins. square, of 1:2:4 stone concrete, corner angles 2 × 2 × ⅝ ins., and center angles 3 × 3 × ½ ins. will carry a load of 117 tons up to a length of 16 ft. The cost of this perfectly fireproofed column will be about $2 per foot. The cost of a steel column of the same capacity will be about $2.28 per foot, without fireproofing.

To the knowledge of the writer no feature of this column is covered by a patent. If so, he would like to hear of it.

Chas. H. Marques.

44 Church St., Charleston, S. C., Aug. 4, 1904.



Reinforced Concrete Column Without Patented Features.

DEFENDANT'S EXHIBIT L L

A NEW FORM OF REINFORCEMENT FOR CONCRETE.

The accompanying illustrations show a new reinforcing bar for concrete construction. As will be seen the novelty consists of a provision for connecting subsidiary reinforcing or web members to the main tension bars at any point without reducing the sectional area or tensile strength of either the main or the connecting bars. The means for accomplishing this desirable result is simply to roll the bars with grooves, as shown by Fig. 1, and then press the lips of this groove together to clasp the web member. The idea is clearly shown in the various accompanying cuts, and it is stated by the inventor that the connection is so strong that in all tests so far made an attempt to pull the small bars free has always resulted in the breaking of this bar remote from the main bar.

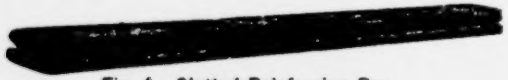


Fig. 1. Slotted Reinforcing Bar.

The drawings Figs. 2, 3 and 4 show the application of the reinforcing bar described to girders, columns and partitions. These illustrations are sufficient to show that the number of combinations is almost limitless. Fig. 2 shows a bar with stirrups attached as would be done in girder reinforcement. It will be noted that the main bar is nowhere reduced in section, and that the stirrups may be attached with any arrangement of spacing desired, that they may be of any length desired and that they may be set at any angle with the main bar that is desired. A point to be noted also is the facility offered for attaching spacing rods either to hold the main bars above the lugging boards or to preserve their distance apart laterally or vertically.

Fig. 3 is a sketch showing the arrangement for column reinforcement, and Fig. 4 is another sketch showing the arrangement for a hollow wall or partition. These two sketches are so clear that extended description is unnecessary.

Fig. 2. Reinforcing Unit for Girders.

In conclusion it may be noted that it is possible either to assemble the reinforcement as shown at the shops and ship it to the work, or simply to ship the bars, rods and mesh in suitable quantities and do the assembling at the site of the work. The apparatus required is very simple, being merely that necessary for binding and cutting the rods and a drop press for clamping together the lips of the grooves in the main b[illegible]

The form of reinforcement described is the invention of Mr. J. G. Golding, of Washington, D. C., well known as the inventor of expanded metal. The Monolith Steel Co., Colorado Bldg., Washington, D. C., is the licensee of the United States patents for this invention.

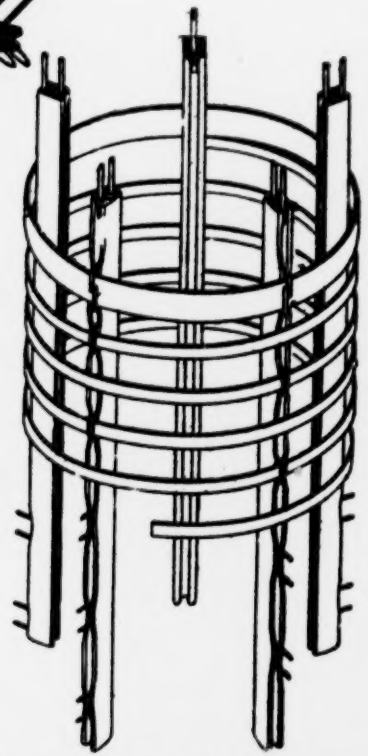


Fig. 3. Reinforcing Unit for Columns.

426

DEFENDANT'S EXHIBIT GG
2—390

UNITED STATES OF AMERICA,
DEPARTMENT OF THE INTERIOR,
UNITED STATES PATENT OFFICE.

To all to whom these presents shall come, Greeting:

THIS IS TO CERTIFY that the annexed is a true copy from the Records of this Office of the File Wrapper and Contents in the matter of the

Letters Patent of
George E. Vandenburgh,

Number 841,741, Granted January 22, 1907,
for
Improvement in Reinforcing-Bars.

IN TESTIMONY WHEREOF I have hereunto set my hand and caused the seal of the Patent Office to be affixed at the City of Washington, this 17th day of March, in the year of our Lord one thousand nine hundred and seventeen and of the Independence of the United States of America the one hundred and forty-first.

(Seal)

F. W. H. CLAY,
Acting Commissioner of Patents.

2—437

NUMBER (SERIES OF 1900).

315959 1906 DIV. 33

PATENT No. 841741 (EX'R'S BOOK) 234

Name George E Vandenburgh 13

Washington

County of

D. C.

Invention Reenforcing Bars

Division of App., No. , 190

PARTS OF APPLICATION FILED , filed

Reissued Aug. 15, 16 No. 14,182

	ORIGINAL.	RENEWED.
Petition	May 9, 1906	, 190
Affidavit	" ", 1906	, 190
Specification	" ", 1906	, 190
Drawing	" ", 1906	, 190
Model or Specimen	, 190	, 190
First Fee Cash $ 15	May 9, 1906	, 190
" " Cert.	, 190	, 190
Appl. filed complete	May 9, 1906	, 190
Examined W A Cowles	Nov. 26 1906	, 190
Countersigned	H B Burch	, 190
	For Commissioner.	For Commissioner.
Notice of Allowance	Dec. 3 1906	, 190
Final Fee Cash $20	Dec. 29, 1906	, 190
" " Cert.	, 190	, 190
Patented	January 22	, 190

Attorney E B Stocking

City

Issue Div.

Associate Attorney

Name

3 Patent No

Serial No

Date of Patent

$15.—RECEIVED Serial No. 315959 Paper No. ½
MAY 9 1906 Application
CHIEF CLERK U. S. PATENT OFFICE

PETITION.

U. S. PATENT OFFICE
MAY 11 1906
DIVISION 33

To the Commissioner of Patents:

Your petitioner George E. Vandenburgh citizen of the United States, residing at Washington, District of Columbia, whose Post Office address is 921 9th St. Washington, D. C. prays that Letters Patent may be granted to him for the improvements in Reenforcing Bars as set forth in the annexed specification.

And he hereby appoints E. B. STOCKING, of Washington, D. C., Registered No. 183, attorney, with full power of substitution and revocation, to prosecute this application, to make alterations and amendments therein, to receive the Patent, to sign the drawings, and to transact all business in the Patent Office connected therewith.

George E Vandenburgh

SPECIFICATION.

To all Whom it may Concern:

Be it Known, That I, George E. Vandenburgh citizen of the United States, residing at Washington, District of Columbia, have invented certain new and useful improvements in Reenforcing Bars of which

the following is a specification, reference being had therein to the accompanying drawing.

This invention relates to a reenforcing bar particularly adapted for cement and concrete construction wherein the bar is embedded in the plastic body to be supported thereby

The invention has for an object to provide a reenforcing bar with one or more spirally disposed coils secured to the bar so as to provide an extended area of contact adapted to resist strain longitudinally and laterally of the bar and to form a truss within the body of concrete or other plastic material which provides the maximum of supporting strength in the arch or surface to be formed.

Other and further objects and advantages of the invention will be hereinafter set forth and the novel features thereof defined by the appended claims.

In the drawing:—

Figure 1 is a vertical section showing the bar applied to supporting girders or beams;

Figure 2 is an enlarged vertical section on the line 2 - 2, Figure 1;

Figure 3 is a detail perspective of the primary and secondary coils shown in Figure 1;

Figure 4 is a similar view of a modified form using one coil;

Figure 5 is a detail plan of the form shown in Figure 3, and

Figure 6 is an elevation of two meshing coils used for girder and column construction.

Like numerals of reference indicate like parts in the several figures of the drawings.

The numeral 1 designates a bar which may be of any desired construction or configuration and supported in any preferred manner, for instance, when used in arch construction it is adapted to rest upon the base of the beams or girders 2 sufficiently above the lower surface thereof to provide for the facing of the concrete or cement beneath the lower face of the bar. The coils 4 are secured to the bar in any desired manner, for instance, as hereinafter described and the plastic material or cement filling 5 applied so as to surround the coils and bar and embed the same therein to form a truss construction.

The bar may be provided with a primary coil 6 extending in one direction, as shown in Figure 4, which is sufficient in light construction, but when a heavier construction is to be used a secondary coil 7 is provided which extends in the opposite direction to the coil 6 and through the same so as to cross beneath the coil 6 at a point directly above the bar, thus providing a construction in which all lateral pull or strain of the coil is avoided owing to the equalization thereof by the oppositely extending coils and the tendency of the coils to move or flatten towards the face of the bar resisted. This preferred construction is shown in Figures 1 and 3, and it is also desirable that both of the coils be deflected away from the center of the bar, as shown in Figure 1 as the greatest supporting strain carried by the arch is at the center thereof and this deflection therefore resists such strain and tends to draw the coils upward into a position at right angles to the bar.

As a preferred means of securing the coils to the

bar I have shown a series of kerfs 8 in one face of the bar inclined away from the center of the bar toward the opposite ends thereof, and the coils are seated within these kerfs and held therein by means of the integral spurs 9 which are forced downward upon the coils when inserted and permanently retain them in position.

In Figure 6 a modified application of the invention is shown where two of the bars are disposed parallel to each other with their coils intermeshing for use in column or girder construction wherein such a construction provides the maximum of strength with the minimum of weight in the reenforcing material.

In the operation of the invention it will be seen that the bar supporting the coil resists any movement thereof longitudinally of the bar and provides the necessary strength upon which the truss structure formed by the coils is carried. These coils being extended in opposite directions and embedded in the material provide the maximum strength to resist either lateral or longitudinal pressure with the medium weight and quantity of material as owing to their opposite direction of curvature they effectually oppose the strain placed thereon while their deflection toward the opposite ends of the bar resists the central downward strain of the arch. It will be seen that this form of bar is very simple and economical in construction while embodying the greatest efficiency in use. This bar although described in connection arch and column construction is adapted for use in any character of metal reenforced concrete or cement construction.

Having now described my invention and set forth its merits, what I claim and desire to secure by Letters Patent is:—

~~Sub. B~~ 1. ~~A reenforcing bar provided with a plu-~~
Oct 30, '06 rality disposed coil secured thereto and having
Sept 27-06 free coils disposed beyond said bar.

2. A reenforcing bar provided with a spir-
" " " ally disposed coil secured thereto and extended
Oct. 30, 06 free of said bar and a secondary spirally dis-
Sept 27 '06 posed coiled strands secured to the bar and extending in the opposite direction to the first mentioned coil.

~~Canceled~~ 3. ~~A reenforcing bar provided upon one~~
Oct 30, '06 edge with a series of kerfs and integral spurs,
" " " forming an enclosing wall thereof and a spiral coil disposed in said kerfs and retained by said spurs.

4. A reenforcing bar provided with a series of kerfs at opposite sides of the center thereof and disposed toward the ends of the bar, op-
" " " positely disposed coils seated in said kerfs, and spurs carried by the bar and forming an enclosing wall for retaining the coils in said kerfs.

5. A reenforcing bar provided at opposite sides of its center with spiral circular coils
Sept. 27-06 secured thereto to extend free of the bar and deflected in opposite directions from the center of the bar.

6. A reenforcing bar provided at opposite sides of its center with spiral coils secured thereto and deflected in opposite directions from the center of the

bar, and a secondary spiral coil secured to the bar and extended in the opposite direction to the first mentioned coil throughout the length thereof.

In Testimony Whereof, I affix my signature in presence of two witnesses.

George E Vandenburgh

Alfred T. Gage
John L. Fletcher

OATH.

District of Columbia
City of Washington—SS.

George E. Vandenburgh the above named petitioner, being duly sworn, deposes and says that he is a citizen of the United States and resident of Washington, District of Columbia, and that he verily believes himself to be the original, first, and sole inventor of the improvements in

Reenforcing Bars

described in the annexed specification; that he does not know and does not believe that the same was ever known or used before his invention or discovery thereof; or patented or described in any printed publication in the United States of America or any foreign country before his invention or discovery thereof or more than two years prior to this application; or in public use or on sale in the United States for more than two years prior to this application, and that no application for foreign patent has been filed by him or his legal representatives or assigns in any foreign country.

George E Vandenburgh

Sworn to and subscribed before me this 7th day of May 1906

(Seal)

John L. Fletcher.
Notary Public,
D. C.

2-260 IAD

Div. 33 Return 164 Paper No. 1 (Rej.)

Address "The Commissioner of Patents, Washington, D. C.," and not any official by name.

All communications respecting this application should give the serial number, date of filing, title of invention, and name of the applicant.

DEPARTMENT OF THE INTERIOR
UNITED STATES PATENT OFFICE

WASHINGTON Sept. 25, 1906.

MAILED " " "

G. E. Vandenburgh, DIV. 33.
Care E. B. Stocking,
Washington, D. C.

Please find below a communication from the EXAMINER in charge of your application, for "Reenforcing Bars", filed May 9, 1906, Serial No. 315,959.

F. I. Allen
Commissioner of Patents.

Claim 1 is rejected on the Swiss patent to:
Muuch, 19,271, C. & F., C. & M.
Claim 2 is rejected on:
Mueser, 815,617, Mar. 20, 1906, M. R.
Claim 3 is rejected on the Swiss patent above in view of: Peabody, 805,663, Nov. 28, 1905, M. R.
Claim 4 is rejected on Peabody.
Claim 5 is rejected on the Swiss patent above.
G.C.W.

W A Cowles
Examiner Division 33.

Serial No. 315,959 Paper No. 2

U. S. PATENT OFFICE
SEP 27 1906
DIVISION 33. AMENDMENT A

IN THE UNITED STATES PATENT OFFICE.

G. E. Vandenburgh.
Reenforcing Bar. Serial No. 315,959.
Filed May 9, 1906. Room No. 164.

Last Official Action Sept. 25, 1906.

The Commissioner of Patents,
Sir:—

I hereby amend the above entitled application in the following particulars:—

Claim 1, line 2, after "thereto" insert:—
—*and having free coils disposed beyond said* bar—

Claim 2, line 2, change "coil" to—coiled strand—
After "thereto" insert: —*and extend free of said bar*— Line 3, before "extending" insert: —*secured to the bar and*—

Claim 3, line 2, after "spurs" insert:
—*forming an enclosing wall thereof*—
Claim 5, line 2, after "spiral" insert: —*circular*—
After "thereto" insert: —*to extend free of the bar*—

Claim 4, line 4, after "bar" insert:
—*and forming an enclosing wall*—

ARGUMENT.

The claims have been amended to clearly distinguish over the Swiss patent cited which does not show the spirally coiled strand secured to the bar to prevent lateral movement thereon, and does not

have the free coils disposed beyond the bar to be embedded in the concrete and form an arch structure of practically the diameter of the coils. In the Swiss patent in Figure 1 a spiral coil is not shown, but the wire is coiled over an oval form as shown in Figure 2a. In neither instance can the extended area of applicant's spiral be secured, and in the use of such a spiral it is necessary that it be secured to the bar to prevent lateral displacement when tamping the material in position. The reference device shows a different form of brace where the wire simply extends between two parallel bars and is only practically of the width of these bars and the diameter of wire thereon. The patent to Mueser merely shows the integral ribs formed on the bar and not a strand extending free thereof for the purpose of applicant's invention so that claim 2 is now believed to clearly define over this patent which is not intended or adapted for the purpose of this invention. The patent to Peabody does not show any spurs forming an enclosing wall for the kerf and adapted thereby to retain the coil in position. As recited in claims 3 and 4 this is a novel means of securing the coils to the bar and should be allowed. An independent discussion of the claims is not believed to be necessary in view of the amendments and the foregoing statement of differences over the references.

Respectfully submitted,

E B Stocking
Attorney

September 27, 1906.

2-260 IAD

Div. 33 Room 164 Paper No. 3 (Rej.)

Address "The Commissioner of Patents, Washington, D. C.," and not any official by name.

All communications respecting this application should give the serial number, date of filing, title of invention, and name of the applicant.

DEPARTMENT OF THE INTERIOR
UNITED STATES PATENT OFFICE

WASHINGTON Oct. 24, 1906.

MAILED " " "

G. E. Vandenburgh,
Care E. B. Stocking,
Washington, D. C.

DIV. 33.

Please find below a communication from the EXAMINER in charge of your application for "Reenforcing Bars", filed May 9, 1906, Serial No. 315,959.

F. I. Allen
Commissioner of Patents.

This case has been considered as amended Sept. 27, 1906.

Claims 1, 3, 4 and 5 are rejected on the Swiss patent of record, in view of:

Kahn, 768,284, Aug. 23, 1904 M. R.,

which shows shear arms attached to the tension bar by being seated in saw-kerfs and grooves and the metal of the bar compressed by the shear arms to maintain the same in its seat.

Claim 6 is allowed.

Does applicant wish the word "coil" in both

places where it occurs in line 2 of claim 2 to be changed to *coiled strand?*

G.C.W.

W. A. Cowles
Examiner Division 33.

U. S. PATENT OFFICE
OCT 31 1906
DIVISION 33.

Serial No. 315,959
Paper No. 4
AMENDMENT B

APPLICATION ROOM
OCT 30 1906
U. S. PATENT OFFICE

IN THE UNITED STATES PATENT OFFICE.

G. E. Vandenburgh.
Reenforcing Bar.
Filed May 9, 1906.

Serial No. 315,959.
Room No. 164.

Last Official Action Oct. 24, 1906.

The Commissioner of Patents,

Sir:—

I hereby amend the above entitled application in the following particulars:—

Claim 2, line 2 change "coils" (2nd occurrence) to—coiled strands—

Cancel claims 1, 3, 4 and 5 and insert—

---

1. In a reenforcing bar, a spiral coil rigidly secured thereto at two points in each convolution thereof and extended beyond and free of said bar at the opposite side therefrom to the securing point.

2. In a reenforcing bar, a spiral coil rigidly secured thereto at two points in each convolution there-

of and extended beyond and free of said bar at the opposite side therefrom to the securing point, said coils being deflected in opposite directions from the center of the bar toward the ends thereof.

3. A reenforcing bar provided upon one end with a series of kerfs each having an integral overlapping spur, and a coil disposed in said kerfs, each convolution thereof being retained beneath one of said spurs.

4. A reenforcing bar provided upon one edge with a series of kerfs disposed diagonally to the length of the bar each having an overlapping integral spur projected toward the center of the bar, coil.

Nov. 21-06

ARGUMENT.

It is submitted that the claims as now presented clearly distinguish over the references of record which do not disclose applicant's bar. The Swiss patent which is relied upon by the Examiner shows windings carried by parallel rods and not secured to either of the rods so that there is nothing except the frictional contact of the wire to retain the same against longitudinal movement on the rods, or a lengthwise sliding of the bar or wire coiled thereon. This patent does not show a fair instance of a spiral coil having every convolution extended beyond the bar, and even if one of the rods be removed would not anticipate applicant's invention because the remaining rod not being attached to the coil could not retain it in operative position. The Examiner will certainly concede that a structure which is in-

operative to accomplish applicant's functions or advantages cannot be a reference therefor, and even though the Swiss patent be reconstructed it lacks the features now defined by applicant's claims 1 and 2. In this connection is should be noted that Figures 1 and 2 of this patent are separate forms of the invention, as shown at 1a and 2a so that the Swiss patent does not shows the wire deflected toward the opposite ends of the bar, and surely each convolution of the wire is not secured to the bar at two points. By applicant's structure the wire is held against any uncoiling by slipping of the bar, and also against longitudinal movement relative to the bar so that the spiral strands when embedded in the concrete form a structure extending continuously from the center toward the opposite ends of the bar the strands being so disposed that the coil of one overlapping the supporting area of another thus securing a practically continuous support through the body of the concrete.

While the patent to Kahn last cited shows a spur pressed upward from the bar, it certainly does not show applicant's kerf extended inward from one edge thereof having the overlapping spur by means of which the coil is retained entirely within the area of the bar and hooked in the kerf so that it cannot be backed out or disengaged therefrom in packing the concrete material in position. The structure of spur which overlaps the coil when in position absolutely retains the latter against any movement rela-

tive to the reenforcing bar and being novel should be granted protection.

Respectfully,

E B Stocking
Attorney.

October 30, 1906.

2-260 TJ

Div. 33 Room 164 Paper No. 5- (Let)

Address "The Commissioner of Patents, Washington, D. C." and not any official by name.

All communications respecting this application should give the serial number, date of filing, title of invention, and name of the applicant.

DEPARTMENT OF THE INTERIOR
UNITED STATES PATENT OFFICE

WASHINGTON November 20, 1906
MAILED " " "

George E. Vandenburgh, DIV. 33.
C/o E. B. Stocking,
Washington, D. C.

Please find below a communication from the EXAMINER in charge of your application, Serial No. 315,959, filed May 9, 1906, For "Reenforcing Bars.

F. I. Allen
Commissioner of Patents.

Responsive to amendment of October 30, 1906.

Claim 2 has been re-numbered 5.

In line 4 of claim 4, "coiled" should be *coil.*

The case otherwise, is in condition for allowance.

G. C. W.

W A Cowles
Examiner Division 33.

Serial No. 315,959 Paper No. 6

S. PATENT OFFICE
NOV 21 1906
DIVISION 33.

AMENDMENT C.

IN THE UNITED STATES PATENT OFFICE.

George E. Vandenburgh.
Reenforcing Bar
Filed May, 9 1906.

Serial No. 315,959.
Room No. 164.

Last Official Action Nov. 20, 1906.

The Commissioner of Patents,

Sir:—

I hereby amend the above entitled application in the following particulars:—

Claim 4, line 4, change "coiled" to —coil—

ARGUMENT.

The formal objections having been removed this case is now in condition for allowance.

Respectfully,

E B Stocking
Attorney.

November 21, 1906.

SM Issue Division

All communications should be addressed to Serial No. 315,959 "The Commissioner of Patents, Washington, D. C."

DEPARTMENT OF THE INTERIOR,
UNITED STATES PATENT OFFICE,
WASHINGTON, D., C.

Dec. 3, 1906.

George E. Vandenburgh,
C/o E. B. Stocking,
Washington, D. C.

Sir: Your APPLICATION for a patent for an IMPROVEMENT IN

Reenforcing Bars,

filed May 9, 1906, has been examined and ALLOWED.

The final fee, TWENTY DOLLARS, must be paid, and the Letters Patent bear date as of a day not later than SIX MONTHS from the time of this present notice of allowance.

If the final fee is not paid within that period the patent will be withheld, and your only relief will be by a renewal of the application, with additional fees, under the provisions of Section 2897, Revised Statutes. The office aims to deliver patents upon the day of their date, and on which their term begins to run; but do this properly applicants will be expected to pay their final fees at least TWENTY DAYS prior to the conclusion of the six months allowed them by law. The printing, photolithographing, and engross-

In Remitting the Final Fee Give the Serial Number at the Head of this Notice.

Uncertified Checks Will Not Be Accepted.

ing of the several patent parts, preparatory to final signing and sealing, will consume the intervening time, and such work will not be done until after payment of the necessary fees.

When you send the final fee you will also send, DISTINCTLY AND PLAINLY WRITTEN, the name of the INVENTOR and TITLE OF INVENTION AS ABOVE GIVEN, DATE OF ALLOWANCE (which is the date of this circular), DATE OF FILING, and, if assigned, the NAMES OF THE ASSIGNEES.

If you desire to have the patent issued to ASSIGNEES, an assignment containing a REQUEST to that effect, together with the FEE for recording the same, must be filed in this office on or before the date of payment of final fee.

After issue of the patent uncertified copies of the drawings and specifications may be purchased at the price of FIVE CENTS EACH. The money should accompany the order. Postage stamps will not be received.

Respectfully,

F. I. Allen
Commissioner of Patents.

2—327.

$ 20/ RECEIVED
DEC 29 1906 Y

CHIEF CLERK U. S. PATENT OFFICE

MEMORANDUM

of

FEE PAID AT UNITED STATES PATENT OFFICE

(Be careful to give correct Serial No.)

Serial No. 215,959 190

INVENTOR: George E. Vandenburgh

Patent to Be Issued to Per record

Name of Invention, as Allowed: Reenforcing Bar

Date of Payment:

Fee: Final $20.

Date of Filing: May 9, 1906

Date of Circular of Allowance: December 3, 1906

The Commissioner of Patents will please apply the accompanying fee as indicated above.

E B Stocking
Attorney.

Send Patent to Issue Division.

SM

2—191

Address only "The Commissioner of Patents, Washington, D. C."

Serial No. 315,959

DEPARTMENT OF THE INTERIOR
UNITED STATES PATENT OFFICE
WASHINGTON

Dec. 29, 1906.

George E. Vandenburgh,
C/o E. B. Stocking,
Washington, D. C.

Sir:

You are informed that the final fee of TWENTY DOLLARS has been received in your application for Improvement in

Reenforcing Bar.

Very respectfully,

F. I. Allen
Commissioner of Patents.

1906

CONTENTS:

Print			
1/2	Application 1 paper.		
1.	Rejection	Sept. 25,	1906
2.	Amendment A	" 27	"
3.	Rejection	Oct. 24	"
4.	Amendment B	" 30	"
5.	Office Letter	Nov. 20	"
6.	Amendment C	" 21	"

72 MASONRY
METAL-REINFORCED

TITLE:
Improvement in Reenforcing Bars.

2—390.

UNITED STATES OF AMERICA,
DEPARTMENT OF THE INTERIOR,
UNITED STATES PATENT OFFICE.

To all to whom these presents shall come, Greeting:

THIS IS TO CERTIFY that the annexed is a true copy from the Records of this Office of the File Wrapper and Contents in the matter of the

Reissue Letters Patent of
George E. Vandenburgh,

Number 14,182, Granted August 15, 1916,

for

Improvement in Reinforcing Bars.

IN TESTIMONY WHEREOF I have hereunto set my hand and caused the seal of the Patent Office to be affixed at the City of Washington, this 17th day of March, in the year of our Lord one thousand nine hundred and seventeen and of the Independence of the United States of America the one hundred and forty-first

(Seal) F. W. H. Clay.

NUMBER (Series of 1915),

(EX'R'S BOOK) 7 - 143

107203 1916 17

DIV. 33 REISSUE No. 14182

Name George E. Vandenburgh

of San Francisco,

, 191 County of

State of California

Invention Reinforcing Bars

granted

PARTS OF APPLICATION FILED

Petition	July 1	, 1916
Affidavit	" "	, 1916
Specification	" "	, 1916
Drawing	" "	, 1916
Old Patent	July 1	, 1916
Abstract of Title (Ordered)	" "	, 1916
Fee Cash $30	July 1	, 1916
Fee Cert. Dep.		, 191
Appl. filed complete	July 1	, 1916

Division of Original Patent No.

Original Patent No. 841,741 Date Jan. 22, 1907

Examined W A Cowles July 19 , 1916

Notice of Allowance JUL 21 1916 , 1916

By Commissioner.

Reissued August 15 , 1916

Attorney Carlos P. Griffin,

704 Pacific B'ld'g, San Francisco, Calif.

Associate Attorney
(No. of Claims Allowed 7)
Title as Allowed Reinforcing Bars
3 (Cl. 72 - 112)

Serial No. 107203 Paper No. 1
Application.

U. S. PATENT OFFICE $30.00 REC'D
JUL 6 1916 JUL 1 1916 M O J.
DIVISION 33. C. C. U. S. PAT. OFFICE

To the Commissioner of Patents:

Your Petitioner, George E. Vandenburgh, a citizen of the United States and a resident of San Francisco, in the county of San Francisco, and State of California, whose post-office address is General Delivery, San Francisco, California, prays that he may be allowed to surrender the letters patent for an improvement in Reinforcing Bar, granted to him Jan. 22, 1907, whereof he is now the sole owner, and that letters patent may be reissued to him for the same improvement upon the annexed amended specification. With this petition is filed an abstract of title, duly certified, as required in such cases; and he hereby appoints Carlos P. Griffin, (Reg. No. 7830), 704 Pacific Building, San Francisco, California, his attorney, with full power of substitution and revocation, to prosecute this application, to make alterations and amendments herein, to sign the drawings, to receive the patent and to transact all business in the Patent Office connected therewith.

Signed at San Francisco, in the county of San

Francisco, and the State of California, this *24th* day of June, 1916.

George E. Vandenburgh.

(Revenue Stamp)

To All Whom It May Concern:

Be it known that I, George E. Vandenburgh, a citizen of the United States, and recently of Washington, District of Columbia and now residing at San Francisco, California, have invented certain new and useful Improvements in Reinforcing-Bars, of which the following is a specification, reference being had therein to the accompanying drawings.

This invention relates to a reinforcing-bar particularly adapted for cement and concrete construction wherein the bar is embedded in the plastic body to be supported thereby.

The invention has for an object to provide a reinforcing-bar with one or more spirally-disposed coils secured to the bar so as to provide an extended area of contact adapted to resist strain longitudinally and laterally of the bar and to form a truss within the body of concrete or other plastic material which provides the maximum of supporting strength in the arch or surface to be formed.

Other and further objects and advantages of the invention will be hereinafter set forth, and the novel features thereof defined by the appended claims.

In the drawings, Figure 1 is a vertical section showing the bar applied to supporting girders or beams. Fig. 2 is an enlarged vertical section on the line 2 2, Fig. 1. Fig. 3 is a detail perspective of the

primary and secondary coils shown in Fig. 1. Fig. 4 is a similar view of a modified form using one coil. Fig. 5 is a detail plan of the form shown in Fig. 3, and Fig. 6 is an elevation of two meshing coils used for girder and column construction.

Like numerals of reference indicate like parts in the several figures of the drawings.

The numeral 1 designates a bar which may be of and desired construction or configuration and supported in any preferred manner. For instance, when used in arch construction it is adapted to rest upon the base of the beams or girders 2 sufficiently above the lower surface thereof to provide for the facing of the concrete or cement beneath the lower face of the bar. The coils 4 are secured to the bar in any desired manner—for instance, as hereinafter described—and the plastic material or cement-filling 5 applied so as to surround the coils and bar and embed the same therein to form a truss construction.

The bar may be provided with a primary coil 6, extending in one direction, as shown in Fig. 4, which is sufficient in light construction; but when a heavier construction is to be used a secondary coil 7 is provided, which extends in the opposite direction to the coil 6 and through the same so as to cross beneath the coil 6 at a point directly above the bar, thus providing a construction in which all lateral pull or strain of the coil is avoided, owing to the equalization thereof by the oppositely-extending coils and the tendency of the coils to move or flatten toward the face of the bar resisted. This preferred construc-

tion is shown in Figs. 1 and 3, and it is also desirable that both of the coils be deflected away from the center of the bar, as shown in Fig. 1, as the greatest supporting strain carried by the arch is at the center thereof, and this deflection therefore resists such strain and tends to draw the coils upward into a position at right angles to the bar.

As a preferred means of securing the coils to the bar I have shown a series of kerfs 8 in one face of the bar inclined away from the center of the bar toward the opposite ends thereof, and the coils are seated within these kerfs and held therein by means of the integral spurs 9, which are forced downward upon the coils when inserted and permanently retain them in position.

In Fig. 6 a modified application of the invention is shown where two of the bars are disposed parallel to each other with their coils intermeshing, for use in column or girder construction, wherein such a construction provides the maximum of strength with the minimum of weight in the reinforced material.

In the operation of the invention it will be seen that the bar supporting the coil resists any movement thereof longitudinally of the bar and provides the necessary strength upon which the truss structure formed by the coils is carried. These coils being extended in opposite directions and embedded in the material provide the maximum strength to resist either lateral or longitudinal pressure with the minimum weight and quantity of material, as owning to their opposite direction of curvature they effectually oppose the strain placed thereon, while their

deflection toward the opposite ends of the bar resists the central downward strain of the arch.

It will be seen that this form of bar is very simple and economical in construction while embodying the greatest efficiency in use. This bar, although described in connection with arch and column construction, is adapted for use in any character of metal, reinforced concrete, or cement construction.

Ex.Amdt

Having now described my invention and set forth its merits, what I claim, and desire to secure by Letters Patent, is:—

1. A concrete reinforcing consisting of a bar having a plurality of integral spurs, and a spiral coil permanently secured thereto by having the spurs bent down on the several coils, the coils extending beyond and free of the bar at the opposite side therefrom to the securing point.

2. A concrete reinforcing consisting of a bar having integral means to secure a coil thereto and a coil permanently secured to the bar in each convolution and extended beyond and free of said bar at the opposite side therefrom to the securing point.

3. A reinforcing-bar provided upon one edge with a series of kerfs each having an integral overlapping spur, and a coil disposed in said kerfs, each convolution thereof being retained beneath one of said spurs.

4. In a reinforcing-bar, a spiral coil permanently secured thereto by spurs bearing on each convolution thereof and extended beyond and free of said bar at the opposite side therefrom to the securing-point

said coils being deflected in opposite directions from the center of the bar toward the ends thereof.

5. A reinforcing-bar provided upon one edge with a series of kerfs disposed diagonally to the length of the bar each having an overlapping integral spur projected toward the center of the bar, and a coil disposed in said kerfs and retained beneath said spurs.

6. A reinforcing bar provided with a spirally-disposed coil secured thereto and extended free of said bar, and a secondary spirally-disposed coiled strain secured to the bar and extending in the opposite direction to the first mentioned coil.

7. A reinforcing-bar provided at opposite sides of its center with spiral coils secured thereto and deflected in opposite directions from the center of the bar, and a secondary spiral coil secured to the bar and extended in the opposite direction to the first-mentioned coil throughout the length thereof.

In Testimony Whereof I have hereunto set my hand this 24th day of June, 1916.

George E. Vandenburgh.

Approved
Under Order 2255,
July 19, 1916.
Ballard L. Ex.

OATH.

State of California
City and County of San Francisco—ss.

George E. Vandeburgh, the above named petitioner, being duly sworn, deposes and says that he does verily believe himself to be the original, first and sole inventor of the improvement set forth and claimed in the foregoing specification and for which improvement he solicits a patent; that deponent does not know and does not believe that said improvement was ever before known or used before his invention thereof; that deponent is a citizen of the United States of America, and resides at San Francisco, in the county of San Francisco, and State of California; that deponent verily believes that the letters patent referred to in the foregoing petition and specification and herewith surrendered are inoperative for the reason that the specification is defective and insufficient, and that such defect and insufficiency consists in the omission therefrom of present claims 1, 2, 3 and 4, and in the use of the word "rigidly" in line 1, original claims 1 and 2, and in the statement that the coils are secured to the reinforcing bar at "two points in each convolution", lines 2 and 3, original claims 1 and 2, as well as in the use of the word "end" in line 2, claim 3; that the original specification in no place makes use of the word "rigidly" with respect to the manner of securing the coils to the bar, and that the bars and coils never were rigidly secured together in any of applicant's constructions, but that they were permanently se-

cured together only, as stated in lines 85 and 86 of the printed copy of the specification; that there is an error in the use of said words "two points" in that while a single coil is secured to the bar at two points in each convlution that where there are a plurality of coils there is only one more securing point than there are coils, and with respect to the word "end" used in line 2 of original claim 3, that said error is not in accordance with the facts, which are that the spurs or kerfs are on the *edge* of the bar and no where shown to be on the "end" of the bar in the original drawing, and that the four claims substituted for claims 1, 2 and 3 are more limited than the claims appearing in the specification; that deponent further says that the error which renders said letters patent so inoperative arose from inadvertence, accident or mistake and without any fraudulent or deceptive intention upon the part of deponent, in that he was personally unfamiliar with the prosecution of patent cases and did not fully understand that words used in the claims must be supported by wording in accordance with the specification and that such error arose with respect to claim 1 because of the purely accidental use by the attorney prosecuting the original application of words not in accordance with the construction, and with respect to claim 3 applicant believes that the word "end" was a mere typographical error for the word *edge*, and he believes with respect to claim 1 that he has claimed as his invention more than he had a right to claim as new; that as soon as said errors came to his knowledge and

attention he applied for this reissue, and that he is the sole owner of said letters patent and hereby offers to surrender the original letters patent.

George E. Vandenburgh.

Subscribed and sworn to before me, a Notary Public in and for the City and County of San Francisco, and State of California, this 24th day of June, 1916.

I. H Anderson

(Seal) Notary Public in and for the City and County of San Francisco, State of California. My Commission expires December 27, A. D. 1918.

THE UNITED STATES OF AMERICA

TO ALL TO WHOM THESE PRESENTS SHALL COME:

Whereas George E. Vandenburgh,
of
Washington, District of Columbia,

Has presented to the Commissioner of Patents a petition praying for the Grant of Letters Patent for an alleged new and useful improvement in

Reinforcing-Bars,

A description of which invention is contained in the specification of which a copy is hereunto annexed and made a part hereof, and has complied with the various requirements of Law in such cases made and provided, and

Whereas upon due examination made the said Claimant is adjudged to be justly entitled to a patent under the Law.

Now therefore these LETTERS PATENT are to grant unto the said George E. Vandenburgh, his heirs or assigns for the term of Seventeen years from the twenty-second day of January one thousand nine hundred and seven the exclusive right to make, use and vend the said invention throughout the United States and the Territories thereof.

In testimony whereof I have hereunto set my hand and caused the seal of the Patent Office to be affixed at the City of Washington this twenty-second day of January in the year of

SURRENDERED
SURRENDERED
SURRENDERED

our Lord one thousand nine hundred and seven and of the Independence of the United States of America the one hundred and thirty-first.

SURRENDERED

(Seal) **F. I. Allen**
Commissioner of Patents.

MAIL ROOM
JUL 1 1916
U. S. PATENT OFFICE.

(Printed Letterhead Omitted)

SAN FRANCISCO

June 26 1916

Hon. Commissioner of Patents
Washington, D. C.

Sir: This patent was omitted from a reissue application mailed this day.

Respectfully
C. P. Griffin

C. P. Griffin,
103510

2—401.

DEPARTMENT OF THE INTERIOR,
UNITED STATES PATENT OFFICE,
WASHINGTON, D. C.

July 6, 1916.

Application of *George E. Vandenburgh, Washington, D. C.*, for Reissue of Letters Patent, No. *841,741* dated *January 22, 1907* for improvement in *"Reinforcing-Bar."*

I certify that careful search has been made in the Digest of Assignments in this Division and that no assignment of undivided interest is found of record under or relating to the aforesaid Letters Patent up to and including *June 16, 1916*

Willis B. Magruder
Chief of Assignment Division.

Serial No. 107203 Paper No. 1
Ex Amendment.
2—254

DEPARTMENT OF THE INTERIOR
UNITED STATES PATENT OFFICE
WASHINGTON, D. C.

July 19, 1916

In compliance with the provisions of order No.

1718, dated June 8, 1907, and which reads as follows:

It is hereby ordered that, except by formal amendment duly signed or as hereinafter provided, no corrections, erasures, or interlineations be made in the body or written portions of the specification or of any other paper filed in an application for patent.

Obvious informalities in the wording of the specification may be corrected by the examiner, but said correction must be in the form of an amendment, approved by the Principal Examiner in writing, placed in the file, and made a part of the record. The changes specified in the amendment will be entered by the clerk in the regular way.

It is directed that no other changes be made by any person in any record of this office without the written approval of the Commissioner of Patents.

Attorneys, employees of the Patent Office, and all others will be held to strict accountability for any violation of this order.

Thomas Ewing
Commissioner.

The following changes are made in—
Application Serial No. 107,203 (Reissue)
of George E. Vandenburgh.
Page 3, line 19, after "connection"
insert with.

.....

Examiner, Division.....

2—184

Address Only
The Commission of Patents
Washington, D. C.

Serial No. 107,203

DEPARTMENT OF THE INTERIOR
UNITED STATES PATENT OFFICE
WASHINGTON

July 21, 1916

George E. Vandenburgh
PATENT
AUG 15 1916
WILL ISSUE

Sir:

Your application for Reissue of Patent No. 841,741 for improvement in Reinforcing Bars has been examined and allowed.

The patent will be forwarded to you as soon as practicable, in due order of business.

Very respectfully,
Thomas Ewing
Commissioner of Patents.

Carlos P. Griffin
704 Pacific Bldg
San Francisco, Cal.

CLASSIFICATION.

1916
Class
CONTENTS:
Application papers.
1. Amendment.

(Order dismissing bill ent. Oct. 18th, 1920, by Judge Westenhaver)

George E. Vandenburgh)
vs.) No. 500. Equity.
Truscon Steel Company)

This cause having been submitted to the Court on the 9th day of June, 1920 upon the pleadings and proofs, and having been argued by counsel for the respective parties, and due deliberation having been had, the Court finds that the equities are with the defendant.

It is, therefore, ordered adjudged and decreed that the said bill of complaint herein be, and the same is hereby dismissed at complainant's costs.

IN THE DISTRICT COURT OF THE UNITED STATES NORTHERN DISTRICT OF OHIO EASTERN DIVISION

GEORGE E. VANDENBURGH, Complainant,)
vs.)IN EQUITY
TRUSCON STEEL COMPANY, Defendant.) No. 500

WESTENHAVER, District Judge.

Plaintiff's bill is in the usual form, charging infringement by defendant of United States Re-issue Letters Patent No. 14,182, granted to him August 15, 1916, being a re-issue of Letters Patent No. 841,471, granted January 22, 1907. The subject of the patent is for a reinforcing bar to be used in concrete construction. On this hearing, claims 1 and 3 only are in issue and relied on. The defenses are invalidity for lack of invention, and non-infringement.

This re-issue patent has been the subject of previous litigation in the Second and Third Circuits. Circuit Judge Hough, May 13, 1918, held, in effect, that claims 1 and 2 of the re-issue patent are invalid if the change made therein from the words "rigidly secured" of the original patent, to "permanently secured" of the re-issue claims embody a different meaning than the original; that claim 3 was not infringed by a construction substantially, if not exactly, similar to the construction here involved; and, finally, that the only invention disclosed by the specifications is the exact construction described and pictured in Figs. 1 and 6. On appeal, the Circuit Court

of Appeals of the Second Circuit held that claims 1 and 2 of the re-issue were invalid as too broad, and, in effect, that claim 3 was valid and infringed. The opinion is brief and contains no review of the prior art. It seems to assume that Judge Hough had disposed of the controversy below on the ground only of non-infringement; and seems to assume rather than to attempt to demonstrate that the feature found to be novel as disclosed by the specifications and covered by claim 3 was, in view of the prior art, patentably novel.

In the Third Circuit, District Judge Orr, December 6, 1918, also held that claims 1 and 2 were invalid because too broad, as stated in the opinion of the Court of Appeals, Second Circuit, and also held that claim 3, in view of the prior art, was invalid for lack of invention. On appeal, the Circuit Court of Appeals agreed that claims 1 and 2 were invalid because too broad, but, assuming the validity of claim 3, held that, being limited, as it must, in view of the prior art, to the specific construction therein disclosed and claimed, was not infringed by a construction somewhat different from the construction here involved. We do not understand this opinion as deciding that claim 3 was valid.

On the hearing before me, the controversy was directed almost entirely to the validity of claim 3, although claim 1 was likewise in issue and relied on. In view of the attitude thus assumed by plaintiff's counsel, and the further fact that all the judges who have heretofore considered and passed on claims 1 and 2 have held them to be invalid because too broad,

I shall adopt that conclusion without further statement of my reasons than to say that I fully agree, both in the conclusion reached and in the reasons given to support it.

Plaintiff's invention is described in his patent as being a reinforcing bar particularly adapted for cement and concrete construction wherein the bar is embedded in the plastic body to be supported thereby. Fig. 6 discloses an adaptation of this reinforcing bar for column or pillar construction, but no contention is made that this is infringed by defendant. Fig. 4, plaintiff contends, also discloses an adaptation of this reinforcing bar for column construction, and that this is also infringed. This contention is disputed, defendant insisting that Fig. 4 is a detail only of a simple and inexpensive form of the beam construction disclosed in Fig. 1. Assuming without admitting plaintiff's contention to be true, Fig. 4 shows merely a bar with a spiral coil attached to the bar at each convolution by a kerf inclined at an angle to the edge of the bar in such a way as to produce an overlapping integral spur, with this spur hammered down so as to hold rigidly this spiral. Defendant makes and sells a collapsible spiral used in strengthening concrete column or pillars. It consists of a cylindrical spiral of steel wire usually fitted to two bars or spacers, with each convolution of the spiral engaging the spacers at regular intervals. The engagement is so loose fitting that this construction, which is normally stove-pipe-shaped, can be made flat for shipment by moving the metal rods or spacers longitudinally in opposite directions. The method whereby

the spiral is attached to the spacer bar is a rectangular notch in the bar, with one or both corners peened or hammered down so as to retain and hold loosely the spiral. Fig. 4 and claim 3 of plaintiff's patent, it is contended, embody and cover this construction; hence the charge of infringement.

The differences in the method of attaching the spiral to the bar, the result accomplished, and the special collapsible mode of operation, between defendant's and plaintiff's construction are such that were I to adopt the limited and narrow construction given to claim 3 by the Third Circuit Court of Appeals, I might likewise dispose of this controversy by holding plaintiff's patent not to be infringed. The inclined kerf method of attachment, with an integral overlapping spur holding the spiral rigidly to the reinforcing bar or spacer, is not the exact method of attachment used by defendant. The kerfs of plaintiff's patent are required to be cut at an inclined angle to the edge of the bar, thereby creating an integral overlapping spur. This kerf and spur when hammered down, the disclosures of the patent show, were intended to and do hold the spiral rigidly or permanently in place. Defendant's spacing bars have merely a rectangular notch cut at right angles in the spacing bar, and when one or both corners are hammered down, the spiral is not held rigidly or permanently in place, but so loosely as to permit of collapsing. These differences in construction are as substantial as those held not to infringe by the Third Circuit Court of Appeals. This, however, seems to me to be too narrow a ground upon which to dispose

of this controversy. It seems to me that if plaintiff's patent is valid because novel and useful in a patentable sense, the charge of infringement could not be repelled by such an insubstantial difference in the method of attachment; particularly as plaintiff's patent suggests this method merely as a preferred method. I have therefore given careful consideration to the charge of infringement.

My conclusion is that if Fig. 4 and claim 3 disclose and cover a concrete reinforcement for columns and pillars of the character now claimed by plaintiff and as is constructed and used by defendant and others, the claim must be held void for want of patentable novelty. My reasons for this conclusion may be briefly stated.

Plaintiff's original application was filed May 8, 1906, and this must be taken as the date of his invention. True, on this hearing he offered some testimony tending to show an earlier invention date, but this testimony is not sufficient, in my opinion, according to well settled rules, to establish an earlier date. The concrete reinforcement art for columns and pillars was at this date quite well developed, although it had not come into such general and extensive use as it now enjoys. This art had been described in standard technical treatises and disclosed in numerous patents and practical constructions. Armand Considere, a French engineer, in a standard work, translated and published in New York in 1903, teaches all that can now be claimed by plaintiff for his patent or that is now done by the defendant in the matter of buildings and reinforcing concrete col-

umns, except perhaps the kerf and spur method of attaching the spiral to the spacing or reinforcing bar or bars. This is, in fact, admitted by plaintiff. Hoops, circular bands, and continuous spirals attached to spacing or reinforcing bars as a method of concrete reinforcement for columns or pillars is also disclosed by numerous patents. See Hyatt British Patent No. 1715, 1874, Pelegren French Patent No. 323,457, 1902, Considere United States Patent No. 752,523, 1904, Kieserling & Moller German Patent No. 73004, 1892. Similar constructions are also described and illustrated by Christophe in an article published in 1902, by Marquess in an article published in the Engineering News of New York in 1904, and also in other articles and illustrations in the Engineering News of March 8, 1906, and June 15, 1905.

In some the method of attaching the spiral to the bar is also disclosed. Kieserling & Moller, above noted, discloses a notch in the outer edge of the spacing bar designed to contain and hold the coils. Cummings, U. S. Letters Patent No. 822,587, application date January 6, 1905, patent date June 6, 1906, shows circular, but not spiral, reinforcing bands for a concrete column attached to the spacer bars by tongues stamped out and then pressed and hammered down over the bands. Christophe, in the article above referred to, discloses notches on the exterior faces of the spacing bars to contain and hold the spiral.

In the metal working arts, numerous patents disclose kerfs or notches, including inclined kerfs with overlapping spurs, as a means of attaching coils or

spirals to bars. See the following U. S. Letters Patent: Norwood, No. 501,575, 1896; Clark, No. 589,593, 1897; Carson, No. 278,282; McCall, No. 657,827; Caldwell, No. 682,386, 1901; Prescott & Bennett, No. 447,162, 1891; and Eason, No. 723,631, 1903. Of these patents, Norwood and Eason disclose the inclined kerf with the overlapping integral spur, and Prescott & Bennett discloses a rectangular notch or kerf cut at right angles to the edge of the bar and with the corners hammered down in the manner of defendant's construction.

Thus it appears that all the elements, both of claim 3 of plaintiff's patent and of defendant's construction, are old. Plaintiff's counsel, as already said, admits this to be true, but contends that the reinforced concrete art does not show the kerf and spur in a combination with reinforcing or spacer bar or bars and a continuous spiral, and that this novelty is of a patentable character. This claim of novelty is not true in view of Kieserling & Moller and Christophe's disclosure unless plaintiff's kerf is to be limited to a kerf inclined at such an angle to the edge of the spacer bar as to create and form an integral overlapping spur. It is the latter method only of attachment which is not plainly shown in the prior art. The numerous examples of hoops, circular bands, and continuous spirals in combination with spacing or reinforcing bars found in the concrete art do not explicitly call for an inclined kerf and integral overlapping spur method of attachment. Notches in which to seat and hold the spiral are, however, called for and disclosed. Doubtless, engineers

like Considere, Christophe, and Marquess, as well as numerous inventors, assume that any reasonably skilled mechanic or engineer would know the means used and available in the metal working art to accomplish this result, and regarded it as unnecessary to make further disclosures or to give more specific directions. Plaintiff's contention, however, now is that any kind of kerf or notch is covered by his patent, and this claim comes in conflict literally with the existing prior art.

Furthermore, invention cannot, in my opinion, be based on the adaptation of the familiar inclined kerf with an integral overlapping spur of the metal working art to its assumed new use in the concrete reinforcing art. Let it once be assumed, as plaintiff's counsel concedes, that the concrete reinforcing art teaches that the proper method of reinforcing a concrete column or pillar is to use hoops or circular bands, or continuous spirals, spaced at regular intervals around spacer or reinforcing bars and attached thereto, then the problem of making this attachment becomes no longer one peculiar to the concrete reinforcing art but belongs to the metal working art. The problem is one of the metal worker, and not of the concrete engineer. For this reason, all the means known to the latter art or used by workers therein, must be regarded as the common possession of all persons skilled in either art, and invention can not be predicated upon a transfer of a device familiar in one to a like use in the other; particularly is this true when no new principle of operation, and no new

function is accomplished or performed as a result of the transfer to the new combination.

That invention is not present under these conditions, and does not result from such an adaptation of an old device, is well settled by numerous decisions. See Huebner-Toledo Breweries Co. vs. Mathews Gravity Carrier Co. (6 C. C. A.) 253 Fed. 435; Berger Mfg. Co. vs. Trussed Concrete Steel Co. (6 C. C. A.) 257 Fed. 741; Van Dorn Iron Works Co. vs. Mathis Bros. Co. (6 C. C. A.) 260 Fed. 400, 405-6. The language of Judge Warrington in the case first cited, is equally applicable here. "It must, of course, be conceded that patentable novelty may exist in a combination of old elements; but here the combination claims in suit are lacking in the usual and essential tests of invention. No new function of elements or new method of operation is evolved, and the result achieved is exactly the same as the old one. The settled rule under such facts is that to adapt an old and familiar device to another structure equally old and well known is not to exercise the inventive faculty; it is to apply the skill of the mechanic."

Plaintiff made his alleged invention in an art already crowded and highly developed. The evidence shows that commercially he has contributed nothing whatever to the progress of reinforced concrete construction. No buildings or column were ever constructed by anyone under his patent prior to 1916. Two licenses only have been issued by him, the first in the latter part of 1916, under which no business appears to have been done except perhaps to put up one structure, and the other followed the favorable

decision in the Second Circuit. Claim 3 of his patent consequently is only another example of that class of patents described by Mr. Justice Bradley in Atlantic Works vs. Brady, 107 U. S. 192, and recently approved and re-announced by Mr. Justice Clarke in Elyria Iron & Steel Co. vs. Railway Supply Co., 242 U. S. 609, in these words: "The process of development in manufacturers creates a constant demand for new appliances, which the skill of ordinary head workmen and engineers is generally adequate to devise, and which, indeed, are the natural and proper outgrowth of such development. Each step forward prepares the way for the next, and each is usually taken by spontaneous trials and attempts in a hundred different places. To grant to a single party a monopoly of every slight advance made, except where the exercise of invention, somewhat above ordinary mechanical or engineering skill, is distinctly shown, is unjust in principle and injurious in its consequences." See also Railroad Supply Co. vs. Elyria Iron & Steel Co., 244 U. S. 285; Package Mach. Co. vs. Johnson Automatic Sealer Co. (6 C. C. A.) 246 Fed. 598, 601; A. Schrader's Son, Inc. vs. Dill Mfg. Co. (6 C. C. A.) 262 Fed. 504.

This conclusion is reached on the assumption that plaintiff's patent and claim 3 disclose what is claimed to be his invention. Personally, however, I agree also with Judge Hough's conclusion that plaintiff's invention was not what he now claims and that what is now claimed is not thereby disclosed, but that the only invention disclosed by his specifications and claims is the exact construction described and pic-

tured in Figs. 1 and 6, as to which no charge of infringement is made.

For these reasons plaintiff's bill will be dismissed at his costs.

D. C. Westenhaver,
Judge.

Cleveland, Ohio
September 23, 1920

[TITLE OF COURT AND CAUSE.]

APPEAL PETITION.

To the Honorable District Court of the United States in and for the Northern District of Ohio.

Now comes George E. Vandenburgh, plaintiff in the above entitled action and feeling himself aggrieved by the dismissal of his complaint by this Court entered on the 18th day of October, 1920, hereby prays that an appeal may be allowed to him from said decree of dismissal to the United States Circuit Court of Appeals in and for the sixth circuit and in connection with this petition herein is presented plaintiff's assignment of errors.

Your petitioner therefore prays that an order allowing said appeal be made and that an order fixing the amount of bond for costs be made upon the allowance of this appeal.

Carlos P. Griffin,
Attorney for G. E. Vandenburgh.

Appeal allowed.

D. C. WESTENHAVER,
Judge.

San Francisco, Cal.
Oct. 30, 1920

Filed Nov 5 1920 At.....o'clock.....M. B. C. MILLER, Clerk, U. S. District Court, N. D. O.

[TITLE OF COURT AND CAUSE.]

ASSIGNMENT OF ERRORS.

Now comes the plaintiff George E. Vandenburgh by his attorney and in connection with his appeal says the Honorable District Court erred as follows:

(1) In adopting "without further statement of reasons" previous decisions as to the invalidity of claim 1.

(2) In not adopting the decisions of the Courts of Appeal of the Second and Third Circuits as to the validity of claim 3.

(3) In holding that the "kerfs of plaintiff's patent are required to be cut at an inclined angle to the edge of the bar."

(4) In holding that the kerf and spur . . . were intended to and do hold the spiral rigidly or permanently in place.

(5) In holding that defendant's spiral is not held rigidly or permanently in place.

(6) In holding claim 1 void.

(7) In holding claim 3 "void for want of patentable novelty."

(8) In holding uncontradicted testimony of two witnesses insufficient to establish the date of plaintiff's original invention.

(9) In holding that combination claims are void because their several elements are old in other arts and locations.

(10) In holding that patents from the metal working arts are pertinent to concrete reinforcing.

(11) In holding that any patent in the record negatives the patentable novelty of either claims 1 or 3 and especially that Kieserling, Moller and Christophe do not do so.

(12) In holding that "Considere, Christophe or Marquess as well as numerous inventors" disclosed or showed anything which anticipates claims 1 or 3.

(13) In holding that plaintiff's claim 3 "comes in conflict literally with the existing prior art.

(14) In holding that "no new function is accomplished or performed as a result . . . of the new combination" of claim 3.

(15) In holding that "no new function of elements or new method of operation is involved, and the result achieved exactly the same as in the old one."

(16) In holding that plaintiff's inability to commercially work his invention more than he has is in any way a bar to recovery on his patent.

(17) In holding that the only invention of plaintiff is "the exact construction described and pictured in Figs. 1 and 6."

(18) In not holding claims 1 and 3 valid and infringed.

(19) In dismissing the complaint at the cost of plaintiff.

CARLOS P. GRIFFIN,
Attorney for G. E. Vandenburgh.

San Francisco, Cal.
Oct. 30, 1920.

Filed Nov 5 1920 Ar.....o'clock.....M. B. C. MILLER, Clerk, U. S. District Court, N. D. O.

(Order fixing amount of cost of bond ent. Nov. 6, 1920 by Judge Westenhaver.)

George E. Vandenburgh)
vs.) No. 500. Equity.
Truscon Steel Company)

In the above entitled cause the plaintiff having filed his petition for an order allowing an appeal together with an assignment of errors.

Now therefore upon motion of Carlos P. Griffin, solicitor for plaintiff and said appeal having been heretofore allowed from the decree dismissing the complaint in the above entitled case, it is hereby ordered that the amount of plaintiff's cost bond on said appeal be and the same is hereby fixed at the sum of $300.00.

It is further ordered that upon the giving of such a bond approved by the Court that a certified copy of the transcript of the records and proceedings herein as submitted by the parties and approved by the Court may be forthwith transmitted to said United States Circuit Court of Appeals for the sixth circuit.

UNITED STATES CIRCUIT COURT OF APPEALS FOR THE SIXTH CIRCUIT

UNITED STATES OF AMERICA,
Sixth Judicial Circuit.—ss.

To Truscon Steel Company

Greeting:

You are hereby cited and admonished to be and appear at a session of the United States Circuit Court of Appeals for the Sixth Circuit, to be holden at the City of Cincinnati, in said Circuit on the* 1st day of January next, pursuant to a petition for appeal filed in the Clerk's office of the District Court of the United States for the Northern District of Ohio, wherein George E. Vandenburgh is appellant and you are appellee to show cause, if any there be, why the decree rendered against the said appellant as in the said petition for appeal mentioned, should not be corrected, and why speedy justice should not be done to the parties in that behalf.

Witness the Honorable Edward D. White, Chief Justice of the United States, this 2nd day of December in the year of our Lord one thousand nine hundred and twenty and of the Independence of the United States of America the one hundred and forty-fifth.

D. C. Westenhaver
Judge of the District Court.

*Not exceeding 30 days from day of signing.

Service of the above citation is hereby acknowl-

edged and appearance of Truscon Steel Co. is hereby entered.

(Seal) W. F. Guthrie
Attorney for Appellee.

Dec 7, 1920

[TITLE OF COURT AND CAUSE.]

In accordance with Section 7 of Rule 44 of the general rules of this Court, it is hereby agreed that the record as presented to the Clerk by the printer, may be certified by the Clerk as required by law and the rules of the appellate court, as a true, full and complete copy of the original pleadings, papers and orders used on the trial of this cause, as set forth in the precipe for transcript, without further comparison by the clerk.

CARLOS P. GRIFFIN,
Attorney for Plaintiff.
W. F. GUTHRIE,
Attorney for Defendant.

Filed Dec 28 1920 A.r.....o'clock.....M. B. C. MILLER, Clerk, U. S. District Court, N. D. O.

[TITLE OF COURT AND CAUSE.]

STIPULATION.

It is hereby stipulated between counsel for the parties hereto that the papers and exhibits originally filed with the District Court may be withdrawn for the purpose of printing the record on appeal therefrom, and consideration of same with a view to further stipulation for shortening the printed record on appeal after which they shall be filed with the Circuit Court of Appeals pending this appeal and that upon its determination they shall be returned to the District Court.

It is further stipulated by and between counsel for plaintiff and defendant that the printed record on appeal in the above entitled case shall consist of the following documents and none other, provided however that any document in evidence which may be omitted from pursuant to this or further stipulation may be used as a physical exhibit by either party should necessity therefore arise, all documents to be printed without extended court headings.

(1) Complaint.

(2) Answer.

(3) The actual testimony of the witnesses.

(4) The copies of patents (except Weinig 168,948, Phelps 175,155, Bauman 212,645, Monier 302,664, Stempel 411,360, Stempel 468,269, Martin 674,538, Villet 722,417, Carey 756,471, Kahn 768,284, Gardner 785,417 and Muesser 815,617) and those

parts of the other documents and printed cuts or photographs offered in evidence.

(5) Decree of dismissal.

(6) Notice of appeal and petition.

(7) Assignment of errors.

(8) Order fixing amount of bond, but which latter need not be printed.

(9) Citation on appeal.

(10) This stipulation.

(11) Any further subsequent stipulation for abbreviating the printed record.

CARLOS P. GRIFFIN,
for Plaintiff.

W. F. GUTHRIE,
for Defendant.

The foregoing stipulation is hereby approved.

D. C. WESTENHAVER.

Dec. 17, 1920.

Filed Dec 17 1920 B. C. Miller, Clerk, U. S. District Court, N. D. O.

[TITLE OF COURT AND CAUSE.]

STIPULATION

It is hereby stipulated and agreed, that the foregoing is a true transcript of said District Court in the above entitled matter as agreed on by the parties.

Dated

CARLOS P. GRIFFIN
Attorney for Appellant
W. F. GUTHRIE,
Attorney for Appellee

[TITLE OF COURT AND CAUSE.]

CLERK'S CERTIFICATE

I, B. C. Miller, Clerk of the District Court of the United States of America for the Northern District of Ohio, do hereby certify that the foregoing is a correct transcription of the record of the said District Court on the matter as agreed upon by the parties.

IN TESTIMONY WHEREOF I have caused the seal of said Court to be hereunto affixed this day of in the year of our Lord Nineteen Hundred and Twenty One.

(Sgd) B. C. MILLER
Clerk of the District Court for the Northern District of Ohio.

Proceedings in the United States Circuit Court of Appeals for the Sixth Circuit

Cause Argued and Submitted

(November 14, 1921. Before Knappen, Denison and Donahue, Circuit Judges.)

This cause is argued by Mr. Carlos P. Griffin for the Appellant and by Mr. W. F. Guthrie for the Appellee and is submitted to the Court.

Decree

(Filed January 4, 1922.)

Appeal from the District Court of the United States for the Northern District of Ohio. This cause came on to be heard on the transcript of the record from the District Court of the United States for the Northern District of Ohio and was argued by counsel.

ON CONSIDERATION WHEREOF, it is now here ordered, adjudged and decreed by this Court, that the decree of the said District Court, in this cause be and the same is hereby affirmed with costs.

Opinion

(Filed January 9, 1922.)

FILED
JAN 9 1922
ARTHUR B. MUSSMAN,
CLERK

No. 3587

UNITED STATES
CIRCUIT COURT OF APPEALS,
SIXTH CIRCUIT.

GEORGE E. VANDENBURGH, *Appellant,* vs. TRUSCON STEEL COMPANY, *Appellee.*	APPEAL from the District Court of the United States for the Northern District of Ohio.

Submitted November 14, 1921.
Decided January 4, 1922.

Before KNAPPEN, DENISON *and* DONAHUE, Circuit Judges.

KNAPPEN, Circuit Judge: Suit for infringement of claims 1 and 3 of reissued patent No. 14,182 (August 15, 1916) to Vandenburgh. The original patent,

No. 841,741, was issued January 22, 1907. The application for reissue was filed July 1, 1916. The invention relates generally to reinforced concrete construction. Its prominently-stated specific object is to "provide a reinforcing bar with one of more spirally-disposed coils secured to the bar so as to provide an extended area of contact adapted to resist strain longitudinally and laterally on the bar, and to form a truss within the body of concrete, etc." As a preferred means of securing the coils to the bar the specification discloses "a series of kerfs in one face of the bar inclined away from the center of the bar toward the opposite ends thereof," the coils being "seated within these kerfs and held therein by means of the integral spurs, which are forced downward upon the coils when inserted and permanently retain them in position." The specifications, considered in connection with the drawings, plainly show an integral spur overlapping the kerf, which when forced downward upon the coils holds them rigidly in position. Claims 1 and 3 read as follows:

"1. A concrete reinforcing consisting of a bar having a plurality of integral spurs, and a spiral coil permanently secured thereto by having the spurs bent down on the several coils, the coils extending beyond and free of the bar at the opposite side therefrom to the securing point."

"3. A reinforcing bar provided upon one edge with a series of kerfs each having an integral overlapping spur, and a coil disposed in said kerfs, each convolution thereof being retained beneath one of said spurs."

The defenses are invalidity of the reissue, lack of invention and noninfringement. The district court held claim 1 invalid as too broad, and claim 3 void for lack of patentable novelty, if construed broadly enough to embrace defendant's structure. The appeal is from a decree dismissing the bill.

The district court was plainly right in holding claim 1 invalid. As will later appear, the only novelty in plaintiff's conception is in the specific method of attaching the coils to the bar by kerfs therein and integral spurs rigidly securing the coils within the kerfs. The claims of the original patent, which were replaced by claims 1 and 2 of the reissue, in terms call for a rigid fastening. The omission of the requirement of rigidity in claims 1 and 2 was apparently intended to cover the feature of collapsibility found in later devices. Claim 1 of the reissue is thus unwarrantably broad. The same conclusion has been reached by the Circuit Courts of Appeals of both the second[1] and third[2] circuits. Claim 3 of the reissue differs from the third claim of the original patent only in the substitution in the reissue of the word "edge" for the word "end" in the original. This is plainly merely a correction of a clerical error. It thus becomes unnecessary to give further consideration to the question of the validity of the reissue.

The real date of plaintiff's invention is more or less material in determining what is prior art as related to invention. Plaintiff's original application

[1] *Vandenburgh* v. *Concrete Steel Co.*, 258 Fed., 143.
[2] *Vandenburgh* v. *Electric Welding Co.*, 263 Fed., 95.

was filed May 9, 1906. He attempted to carry the actual date of his invention back to 1903, and offered some testimony tending to show such earlier invention date. The trial judge held the testimony not sufficient to establish such earlier date. We can not disturb this conclusion. The evidence consisted solely of the oral testimony of plaintiff and another witness, taken in open court. Under well-settled rules, the burden rested heavily upon plaintiff to establish the fact of the asserted earlier date of invention to the satisfaction of the court,—whether or not such satisfaction is required to be beyond a reasonable doubt. *St. Paul Plow Works* v. *Starling*, 140 U. S., 184, 198; *Clark Co.* v. *Willimantic Co. ibid.* 481, 492; *Moline* v. *Rock Island* (C. C. A., 7), 212 Fed., 727, 732; *Barber v. Otis* (C. C. A., 2), 271 Fed., 171, 180. The question presented was one of fact only, depending upon the weight to be given this oral testimony; and the trial court's conclusion thereon must be accepted here unless the evidence decidedly preponderates against it. *Pugh* v. *Snodgrass* (C. C. A., 6), 209 Fed., 325. Assuming that we are at liberty, upon this record,[1] to consider this testimony, it is enough to say that the evidence does not preponderate against the conclusion of the trial judge.

Turning to claim 3: The art of steel-reinforced concrete construction generally was highly developed before Vandenburgh entered the field. It had

[1] The testimony is not certified as settled and approved by the trial judge, as required by General Equity Rule 75 (b). It appears to have been merely stipulated by counsel.

been applied not only to the construction of bridges, spandrel walls, dock walls, retaining walls and fireproof floor construction, but specifically to beam, girder and column construction in manufacturing and other buildings.[1] The art, generally speaking was already old and crowded, although the more extensive and rapid use of metal-reinforced concrete came a little later. Truss reinforcement of concrete beams was also old, through the use of radially disposed projections from the tension member (either perpendicularly or obliquely thereto), as well as otherwise. See *Trussed Concrete Steel Co.* v. *Goldberg* (C. C. A., 6), 222 Fed., 506, 509 *et seq.* The art with which we are here concerned relates to that form of column construction called "column hooping." While Vandenburgh's invention seems more specially adapted to beam and girder construction, it is declared by the specification to be applicable to column construction as well; and we shall treat the disclosure not only as so applicable but as intended to cover a plurality of vertical reinforcing or spacing members around and upon which steel reinforcement is wound in spiral form. Vandenburgh was not a pioneer in this field. Hyatt (by British patent, 1874), and Lee (also by British patent, in 1885) had disclosed iron bands looped spirally to reinforcing members, the spirals being riveted to each other or to the vertical reinforcement. Kiesserling (German

[1] We may refer in this connection to the following decisions of ths court: *Ferris Concrete Steel Co.* v. *Concrete Steel Co.*, 206 Fed., 666; *City of Akron* v. *Bone*, 221 Fed., 944; *Detroit Iron & Steel Co.* v. *Carey*, 236 Fed., 924; *Luten v. Whittier*, 251 Fed., 590.

patent, 1894) had disclosed columnar reinforcement by way of a series of loops attached to vertical members by square notches therein. Column hooping seems to have become active abroad about the year 1902, and in the United States about a year later; and in articles published in 1902 and 1904 column hooping was described and illustrated, the 1902 publication disclosing notches on the exterior faces of the supporting members to contain and hold the spirals. Considere (United States patent, 1904) disclosed a reinforcement consisting of longitudinal rods and "independent helicoidal coils of metal . . . surrounding the core and rods," the coils apparently not being attached to the longitudinal members; and the next year published his researches in connection with the use of "continuous helicoidal spirals." In March, 1906, the *Engineering News* published an illustrated description of metal reinforcement for columns, showing spiral reinforcement retained in place upon the vertical members between projections from the surface thereof.

It is thus apparent that Vandenburgh's invention, at the best, consisted only in the method of attaching the spiral loop to the vertical or spacing member. As already said, his method of attachment was by means of a kerf cut at an angle inclined to the edge of the vertical or spacing member, which thereby created an overhanging spur integral with the upright, the hammering down of this kerf and spur making a rigid connection between the spiral and the upright. It is true that this particular method

of attaching the loop to the upright was new as al-applied to the art of metal-reinforced concrete. But, as already shown, continuous spirals in connection with spacer bars were old in that art. It was old in metal construction generally to use that method of fastening wires to uprights, as shown by Norwood (patent, 1896) in the connection of longitudinal parallel wires with the cross-bars of sand-screens, where "diagonal slots forming acute-angle hooks" receive the wires, the hooks being "bent down to hold such wires in place." The same method had been disclosed for the fastening of fence wires to posts of cement construction, the attachment of course not being directly to the cement. We recognize that the use of diagonal kerf and overhanging spur method of connection in a non-analogous art did not anticipate the combination claim in question; but we are not considering anticipation, but invention, and the prior art in question is thus not irrelevant. *Day* v. *Mountain City Mill Co.* (C. C. A., 6), 264 Fed., 963, 964-5. The adaptation of an inclined kerf and overhanging spur connection to the reinforced concrete art amounted only to a common mechanical expedient. *Berger Mfg. Co.* v. *Trussed Steel Concrete Co.* (C. C. A., 6), 257 Fed., 741.

The defendant does not use the diagonal kerf and overhanging spur. Its coil is located in a rectangular cut in the edge of the upright, there being thus no overhanging spur, and the coil is held in position by hammering or "peening" down the metal at the edges of the rectangular cut sufficiently to hold the coil in position, not rigidly but loosely enough to permit

the collapsing of the structure for purposes of shipment. Defendant's method of fastening was also old in the metal construction art, being shown in Prescott & Bennett's 1891 sand-screen patent. The patent in suit has been considered by the Circuit Courts of Appeals of the second and third circuits. In the former (*Vandenburgh* v. *Concrete Steel Co., supra,*) claim 3 was held to disclose invention and to be infringed by a construction which seems to be substantially similar to that involved here. In the Third Circuit (*Vandenburgh* v. *Electric Welding Co., supra*) claim 3 was held limited by the prior art to a bar with kerfs in which the attached coil is placed, and a tongue or spur overlapping the kerf and holding the coil in place, and as so limited not infringed by a fastening consisting of a lip or clip struck up from the face of the spacing member.

We are not impressed that the advance in reinforced concrete construction is due in any substantial measure to Vandenburgh's contribution. Our conclusion is that, assuming for the purposes of this opinion that the claim in question involves some measure of invention, it is so narrow as to be practically limited to the specific method of fastening disclosed, and that it cannot be extended to cover defendant's method.

The decree of the district court is accordingly affirmed.

UNITED STATES CIRCUIT COURT OF APPEALS
FOR THE SIXTH CIRCUIT

I, Arthur B. Mussman, Clerk of the United States Circuit Court of Appeals for the Sixth Circuit, do hereby certify that the foregoing is a true and correct copy of the record and proceedings in the case of *George E. Vandenburgh* v. *Truscon Steel Company*, No. 3587, as the same remains upon the files and records of said United States Circuit Court of Appeals for the Sixth Circuit, and of the whole thereof.

In testimony whereof, I have hereunto subscribed my name, and affixed the seal of said Court, at the City of Cincinnati, Ohio, this 1st day of February, A. D. 1922.

ARTHUR B. MUSSMAN,

[SEAL.] *Clerk of the United States Circuit Court of Appeals for the Sixth Circuit.*

UNITED STATES OF AMERICA, *ss:*

[Seal of the Supreme Court of the United States.]

The President of the United States of America to the Honorable the Judges of the United States Circuit Court of Appeals for the Sixth Circuit, Greeting:

Being informed that there now pending before you a suit in which George E. Vandenburgh is appellant, and Truscon Steel Company is appellee, No. 3587, which suit was removed into the said Circuit Court of Appeals by virtue of an appeal from the District Court of the United States for the Northern District of Ohio, and we, being willing for certain reasons that the said cause and the record and proceedings therein should be certified by the said Circuit Court of Appeals and removed into the Supreme Court of the United States, Do hereby command you that you send without delay to the said Supreme Court, as aforesaid, the record and proceedings in said cause, so that the said Supreme Court may act thereon as of right and according to law ought to be done.

Witness the Honorable William H. Taft, Chief Justice of the United States, the sixth day of April, in the year of our Lord one thousand nine hundred and twenty-two.

WM. R. STANSBURY,
Clerk of the Supreme Court of the United States.

United States Circuit Court of Appeals for the Sixth Circuit, *ss.*

In pursuance of the command of the within writ of certiorari, I, Arthur B. Mussman, Clerk of the United States Circuit Court of Appeals for the Sixth Circuit, do herewith transmit under the seal of said court, a full, true and complete copy of the record and proceedings of said court in the cause and matter in said writ of certiorari stated, to the Supreme Court of the United States, together with the said writ.

Witness my official signature and the seal of said court at Cincinnati, Ohio, in said Circuit, this 28th day of April, A. D. 1922 and in the 146th year of the Independence of the United States of America.

[Seal of the United States Circuit Court of Appeals, Sixth Circuit.]

ARTHUR B. MUSSMAN,
Clerk U. S. Circuit Court of Appeals.

[Endorsed:] 3587. (C. C. A.). File No. 28,719. Supreme Court of the United States, October Term, 1921. No. 764. George E. Vandenburgh vs. Truscon Steel Company. Writ of Certiorari. Filed Apr. 17, 1922. Arthur B. Mussman, Clerk.

94593

TRANSCRIPT OF RECORD.

SUPREME COURT OF THE UNITED STATES.

OCTOBER TERM, [redacted] 1922

No. [redacted] 238

CONCRETE STEEL COMPANY, PETITIONER,

vs.

GEORGE E. VANDENBURG.

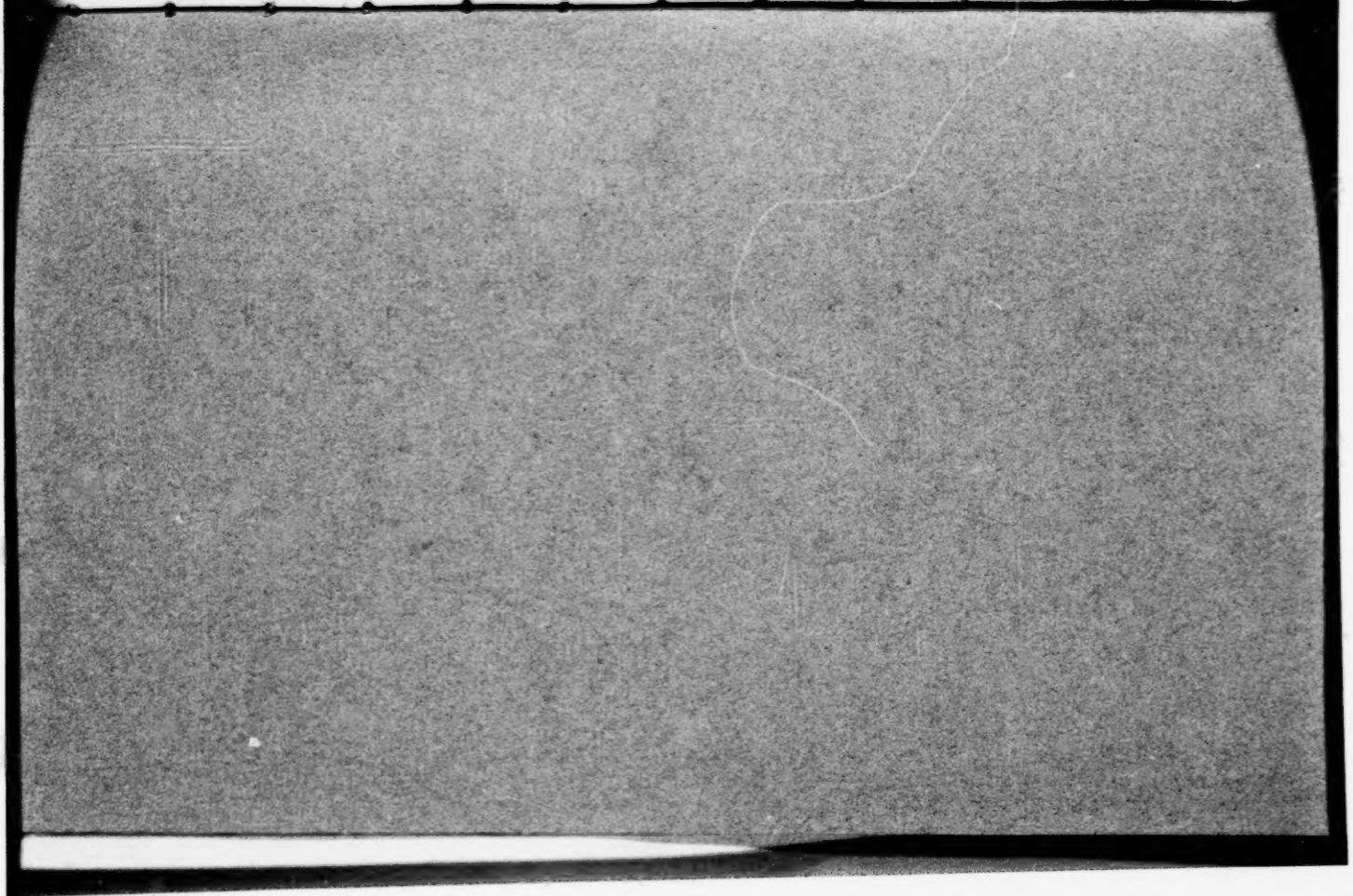
WRIT OF CERTIORARI TO THE UNITED STATES DISTRICT COURT FOR THE SOUTHERN DISTRICT OF NEW YORK.

Circuit Court of appeals for the Second Circuit

PETITION FOR CERTIORARI FILED JANUARY 3, 1923.

CERTIORARI AND RETURN FILED FEBRUARY 11, 1923.

(28,629)



(28,629)

SUPREME COURT OF THE UNITED STATES.

OCTOBER TERM, 1921.

No. 674.

CONCRETE STEEL COMPANY, PETITIONER,

vs.

GEORGE E. VANDENBURG.

ON WRIT OF CERTIORARI TO THE UNITED STATES ~~DISTRICT~~ Circuit COURT ~~FOR THE SOUTHERN DISTRICT OF NEW YORK~~ of Appeals for the Second Circuit

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IN THE

United States District Court,

FOR THE SOUTHERN DISTRICT OF NEW YORK

GEORGE E. VANDENBURGH, Complainant, vs. CONCRETE STEEL COMPANY, Defendant.	In Equity. No. 14-88.

2

Bill of Complaint

George E. Vandenburgh, a citizen of the United States, and a resident of the State of California, brings this his bill of complaint against the Concrete Steel Company, a corporation duly organized and existing under the laws of the State of Delaware, and having a place of business at Room 1,200, 42 Broadway, N. Y., in the State of New York, and for cause of action alleges and avers:

3

I.—That heretofore, to-wit, on and prior to May 9th, 1906, your orator was the original, first and sole inventor of a certain new and useful reinforcing bar particularly adapted for cement and concrete construction, more fully described in the reissue patent hereafter referred to and made a part hereof.

II.—That said invention was new and useful, not known or used by others in this country, and

not patented or described in any printed publication in this or any foreign country before the invention thereof by said George E. Vandenburgh, or more than two years prior to May, 1906, and not in public use or on sale in the United States for more than two years prior to May 9th, 1906, and not abandoned by your orator.

III.—That your orator did, on the aforesaid ninth day of May, 1906, duly and regularly make and file an application for patent on said invention in the United States Patent Office at Washington, D. C., praying the grant to him of a patent for said invention.

IV.—That thereafter upon due and regular proceedings had by the Patent Office in the matter of said Patent Application on the twenty-second day of January, 1907, letters patent number 841,741 were regularly granted and delivered by the United States Government to your orator, his heirs and assigns wherein and whereby there was secured to your orator his heirs and assigns for the full term of seventeen years from the 22d day of January, 1907, the sole and exclusive right to make, use and vend said invention throughout the United States of America and its territories.

V.—That said letters patent were issued in due form of law under the seal of the Patent Office of the United States, and were duly signed by the Commissioner of Patents, or by his Assistant acting for him, and prior to the grant thereof all proceedings were had which were then required

by the law to be taken prior to the grant of letters patent for new and useful inventions, and were thereafter delivered to your orator. 7

VI.—That thereafter it appeared to your orator that said letters patent were defective and insufficient by reason of the fact that your orator had claimed more than he had a right to claim as new, and by reason of the fact that the verbiage of the claims were defective in not precisely corresponding with the terms of the Specifications whereupon on, to-wit, July 1st, 1916, being 8 then sole owner of all right, title and interest in said patent, your orator prepared in accordance with law and filed an application with the Commissioner of Patents of the United States to have said Patent reissued; that thereafter due proceedings were had by the United States Patent Office, and in regular course said Patent was reissued and was delivered to your orator granting to him rights of the same effect and operation in law as if the same had been originally filed in such corrected form, and that the errors or mistakes in the original Patent arose by accident or inadvertence and without fraudulent or deceptive intention on the part of your orator. 9

VII.—That said reissued letters patent were granted in due form of law under the seal of the United States Patent Office, and were signed by the Acting Commissioner of Patents and bear date of August 15, 1916, under the number 14,182, and that all requisite proceedings were had prior to the reissue of said letters patent which are

required by law in such cases, and profert is hereby made of said reissued letters patent, or a certified copy thereof, for a more complete and full description of the invention covered thereby; and that your orator is now the sole owner of all right, title and interest in said reissued letters patent.

VIII.—Your orator further shows unto your Honors that said invention as covered and protected by said patent and said reissues thereof,
11 is of great and increasing value and utility and that the public generally has respected and acquiesced in the validity of said letters patent and the reissue thereof; that your orator has extensively practised said invention and has marked his concrete reinforcement with the word "Patented" and with the dates of said patent and of said reissue patent herein referred to; that your orator is desirous of preserving to himself all rights secured to him under said patent and the reissue thereof, and that he has a regular and established license fee for the use of said invention where he has permitted others to use it.
12

IX.—That notwithstanding the premises, but well knowing the same and for the purpose of injuring and damaging your orator in violation of his rights and without right or license from him, since the issuance of said letters patent, and since the reissuance thereof, within six years last past in the City of New York, State of New York, the Concrete Steel Company, the above named defendant has made and sold to divers persons and corporations, which persons and corporations are now using concrete reinforcing bars

containing and embodying the invention disclosed and claimed in the patent and reissued patent aforesaid; that defendant has made and sold several thousand tons of said concrete reinforcing and that said defendant notwithstanding notice by registered mail of such infringement threatens to continue the same, and does now continue such infringement of the rights secured to your orator as set forth and disclosed in the patent and reissue patent aforesaid.

X.—Your orator further shows unto your 14
Honors that he has notified said defendant by registered letter to desist from such infringement of his rights in the premises, but notwithstanding such notice the said defendant has utterly refused and neglected to discontinue the manufacture and sale of said concrete reinforcing and threatens to continue the making, using and selling of said concrete reinforcing bars embodying the invention herein referred to, and your orator further avers that such infringement of his rights by the defendant will work an irreparable damage, loss and injury to your orator unless restrained by the order of this Honorable Court. 15

XI.—Your orator further avers that by reason of such infringement defendant has made large gains and profits and your orator has suffered and sustained injuries and damages in a large amount, the total of which cannot be ascertained without the taking of an account and the amount of which is at present unknown to your orator.

XII.—That your orator has no plain, speedy or adequate remedy at law and can be relieved

only in a Court of Equity where matters of that nature are cognizable.

WHEREFORE YOUR ORATOR PRAYS:

That defendant be required to answer, an Oath thereupon being expressly waived, to the best and utmost of his knowledge fully, perfectly and truly, all and singular, the things charged in the aforesaid Bill of Complaint; that said defendant, his or their several agents, employees, servants,
17 attorneys, workmen and others acting for him, be enjoined and restrained from infringing said Letters Patent and the Reissue thereof; that said defendant be ordered to account for and pay over to your orator the gains and profits which he has made and realized, and in addition to said actual damages sustained by your Orator because of said infringement, that the amount thereof be increased three times as provided by the law in such cases made and provided because of the wilful nature of said infringement; that to ascertain the amount of such manufacture and sales a
18 master be appointed; and that plaintiff have his costs of this action.

May it please your Honors to grant unto your Orator a writ of injunction issued out of and under the seal of this Honorable Court, *pendente lite* and until final hearing, enjoining and restraining said defendant, his or their several agents, attorneys, employees, servants, workmen, and others acting for him, from making, selling or using, or causing to be made, sold or used, any concrete reinforcing bars with spirally disposed coils secured thereto as set forth in said patent No. 841,741 and reissue patent No. 14,182, and

that upon final hearing of this case that said injunction be made perpetual, and that your orator have such other further and additional relief as shall seem meet in equity and good conscience.

Wherefore may it please your Honors to grant unto your Orator a Writ of Subpoena *ad Respondendum* directed to the defendant Concrete Steel Company, commanding it or him by a day certain, and under a certain penalty, to be and appear in this Honorable Court and to then and 20 there answer this Bill of Complaint, and to abide by such order and decree as your Honors shall then make.

GEORGE E. VANDENBURGH,
Complainant.

CARLOS P. GRIFFIN,
Counsel for Complainant.

JAMES H. GRIFFIN,
Solicitor for Complainant.

22

Answer

UNITED STATES DISTRICT COURT

SOUTHERN DISTRICT OF NEW YORK

GEORGE E. VANDENBURGH, Plaintiff, vs. CONCRETE STEEL COMPANY, Defendant.	In Equity. 14-88. Reissued Letters Patent 14,182.

23

To the Honorable the Judges of the United States District Court for the Southern District of New York:

The defendant, Concrete Steel Company, answering the bill of complaint herein, says:

1. Defendant has no knowledge, save from the bill of complaint, that George E. Vandenburgh, named in the bill of complaint, is a citizen of the United States or a resident of the State of California; and leaves the plaintiff to make such
24 proof thereof as he may deem advisable.

2. Defendant avers that it is a corporation duly organized and existing under the laws of the State of Delaware, and that it has a place of business at Room 1200, No. 42 Broadway, in the City, County and State of New York.

3. Defendant denies each and every of the allegations contained in paragraph 1 of said bill of complaint, and leaves the plaintiff to make such proof thereof as he may deem advisable.

4. Defendant denies each and every of the allegations contained in paragraph II of said bill of complaint, and leaves the plaintiff to make such proof thereof as he may deem advisable.

5. Defendant admits that one George E. Vandenburgh made an application for patent in the United States Patent Office at Washington, D. C., on the ninth day of May, 1906; but defendant denies each and every of the other allegations contained in paragraph III of said bill of complaint, and leaves the plaintiff to make such proof 26
thereof as he may deem advisable.

6. Defendant admits that on the 22d day of January, 1907, Letters Patent No. 851,741 were granted to one George E. Vandenburgh, his heirs and assigns, for the term of seventeen years from the 22d day of January, 1907; but defendant denies each and every of the other allegations contained in paragraph IV of said bill of complaint, and leaves the plaintiff to make such proof thereof as he may deem advisable.

7. Defendant admits that Letters Patent No. 27
841,741 were issued under the seal of the Patent Office of the United States, and were duly signed by the Commissioner of Patents, or by his assistant, acting for him; but defendant denies each and every of the other allegations contained in paragraph V of said bill of complaint, and leaves the plaintiff to make such proof thereof as he may deem advisable.

8. Defendant admits that on July 1, 1916, one George E. Vandenburgh filed an application with

28 *Answer.*

the Commissioner of Patents of the United States, to have said patent 841,741 reissued; but defendant denies each and every of the other allegations contained in paragraph VI of said bill of complaint, and leaves the plaintiff to make such proof thereof as he may deem advisable.

9. Defendant admits that on said application filed July 1, 1916, certain reissued Letters Patent were granted under the seal of the United States Patent Office, and were signed by the Acting
29 Commissioner of Patents, and bear date of August 15, 1916, under the number 14,182, but defendant denies each and every of the other allegations contained in paragraph VII of said bill of complaint, and leaves the plaintiff to make such proof thereof as he may deem advisable.

10. Defendant denies each and every of the allegations contained in paragraph VIII of said bill of complaint, and leaves the plaintiff to make such proof thereof as he may deem advisable.

30 11. Defendant admits that since the 22d day of January, 1907, and since the fifteenth day of August, 1916, within the last six years, in the City of Chicago, State of Illinois, and in the City of Youngstown, in the State of Ohio, defendant has made and sold to divers persons and corporations, which persons and corporations are now using, concrete reinforcing bars; and that defendant has made and sold several thousand tons of concrete reinforcing; and defendant admits that it was notified of the alleged infringement of Letters Patent 841,741 and Reissue 14,182; but

defendant denies that any concrete reinforcing bars or concrete reinforcing that it has made or sold, are an infringement of either of said Letters Patent; and defendant denies each and every of the other allegations contained in paragraph IX of said bill of complaint, and leaves the plaintiff to make such proof thereof as he may deem advisable; and defendant denies that it has committed, or threatened to commit, any wrongful or unlawful acts; and defendant denies that anything it has done or indicated its intention to do, has caused or will cause any damage to plaintiff.

12. Defendant admits that it was notified of the alleged infringement of Letters Patent 841,741 and Reissue 14,182; but defendant denies that any concrete reinforcing or concrete reinforcing bars that it has made, used or sold are an infringement of said Letters Patent; and defendant denies each and every of the other allegations contained in paragraph X of said bill of complaint, and leaves the plaintiff to make such proof thereof as he may deem advisable.

13. Defendant denies that it has infringed either of said Letters Patent 841,741 or Reissue 14,182; and defendant denies each and every of the other allegations contained in paragraph XI of the said bill of complaint, and leaves the plaintiff to make such proof thereof as he may deem advisable.

14. Defendant admits that matters of the nature alleged in the bill of complaint are cognizable in a court of equity.

34 *Answer.*

15. Defendant further answering avers that said Reissue 14,182 is and always has been invalid and void, and of no force or effect, because of each and every of the matters hereinafter set forth, and defendant hereby gives notice to the plaintiff and his attorneys, counsel and solicitor, that on the trial of this cause, defendant will give in evidence, under the general issue plea, each and every of the following special matters:

35 (a) That for the purpose of deceiving the public the description and specification filed by the patentee in the Patent Office was made to contain less than the whole truth relative to his invention or discovery, or more than is necessary to produce the desired effect;

(b) That he had surreptitiously or unjustly obtained the patent for that which was in fact, invented by another, who was using reasonable diligence in adapting and perfecting the same;

(c) That it has been patented or described in some printed publication prior to his

36 supposed invention or discovery thereof, or more than two years prior to his application for a patent therefor;

(d) That he was not the original and first inventor or discoverer of any material and substantial part of the thing patented;

(e) That it had been in public use or on sale in this country for more than two years before his application for a patent, or had been abandoned to the public.

16. And defendant avers, that in view of the art existing prior to any alleged invention or discovery by said George E. Vandenburgh, there is

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nothing described, shown or claimed in said patent 14,182, involving any invention or discovery whatever; and that the thing described, shown and claimed in said patent 14,182 involves in its manufacture only the ordinary skill of the mechanic, and does not involve any invention whatsoever; and that in view of the art existing prior to any alleged invention or discovery by the said George E. Vandenburgh, the said patent 14,182, if valid at all, must be limited to the precise thing described and claimed in said patent, and as so limited, nothing made, used or sold by this 38
defendant is embraced within the claimed subject-matter of said patent; and that prior to any supposed invention or discovery by the said George E. Vandenburgh, the thing patented by said patent 14,182 and all material and substantial parts thereof, had, in the United States, been invented by, and had been known to, others.

17. And defendant avers that claims 1 and 2 of said reissued Letters Patent are broader than any claims in said original Letters Patent, and also broader than the alleged invention disclosed 39
in said original Letters Patent; that is to say, claims 1 and 2 of said reissued Letters Patent define and include a structure or structures which were not defined or included in any claims or in the description or drawings of said original Letters Patent; and said reissued Letters Patent, and particularly claims 1 and 2 thereof, are therefore void and without effect in law.

18. And defendant believes and therefore avers that long prior to July 1, 1916, the date of application for said reissued Letters Patent, plain-

tiff was aware of the acts of defendant now complained of, but delayed to apply for a reissue; and on account of said delay and plaintiff's laches, said reissued Letters Patent, and particularly claims 1 and 2 thereof, are void and of no effect in law.

19. And defendant avers that during the period between the issuance of said original Letters Patent, and the filing of the application for said reissued Letters Patent, it had in good faith built
41 up and extended its business in respect of the acts complained of, which on account of plaintiff's delay and laches in applying for said reissue, make it now most inequitable and unjust and in derogation of defendant's rights, that said reissued Letters Patent should now be asserted against it.

20. All of which foregoing statements and defenses this defendant is willing and ready to aver, maintain and prove as this Honorable Court may direct, and without admitting as true any of
42 the matters charged and alleged in said bill of complaint not herein well and sufficient answered, traversed and avoided or denied, this defendant prays to be hence dismissed with its reasonable costs and charges in its behalf most wrongfully sustained.

CONCRETE STEEL COMPANY,
By LUCIUS E. VARNEY,
Its Solicitor,
149 Broadway,
New York, N. Y.

EMERY, BOOTH, JANNEY & VARNEY,
DELOS G. HAYNES,
Of Counsel for Defendant.

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Minutes of the Trial

UNITED STATES DISTRICT COURT

SOUTHERN DISTRICT OF NEW YORK

GEORGE E. VANDENBURGH, Plaintiff, vs. CONCRETE STEEL COMPANY, Defendant.	In Equity. 14-88.

44

New York, N. Y.,

Friday, May 10th, 1918.

Before:—HON. CHARLES M. HOUGH, *Circuit Judge*, holding the District Court for the Southern District of New York.

APPEARANCES:

CARLOS P. GRIFFIN, ESQ., and JAMES H. GRIFFIN, ESQ., for Plaintiff.

LUCIUS E. VARNEY, ESQ., for Defendant. 45

Mr. Griffin: I offer in evidence the original patent in suit.

Marked Plaintiff's Exhibit 1.

Also the re-issue patent.

Marked Plaintiff's Exhibit 2.

The Court: Let it be noted that the suit is based on claims 1, 2, 3 and 5.

Mr. Griffin: I offer in evidence defendant's device.

Marked Plaintiff's Exhibit 3.

I offer in evidence excerpts from the testimony

46 *Minutes of the Trial.*

in the Pittsburgh suit tried before Judge Orr but not yet decided.

Marked Plaintiff's Exhibit 4.

I offer in evidence defendant's catalogue, page 6.

Marked Plaintiff's Exhibit 5.

I offer in evidence defendant's device in suit in the case of Vandenburgh against Electric Welding Co.

Marked Plaintiff's Exhibit 6.

I offer in evidence a circular of plaintiff's li-
47 censee.

Marked Plaintiff's Exhibit 7.

Plaintiff's *prima facie* proofs closed.

DEFENDANT'S PROOFS.

Mr. Varney: I offer in evidence book of prior art patents.

Marked Defendant's Exhibit A.

I offer in evidence the file wrapper of the original patent.

Marked Defendant's Exhibit B.
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I offer in evidence the file wrapper of the reissue patent in suit.

Marked Defendant's Exhibit C.

I offer in evidence a stipulation.

Marked Defendant's Exhibit D.

Testimony Closed.

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Plaintiff's Exhibit No. 4

Excerpts from Testimony in the Case of

Vandenburgh v. *Electric Welding Co.*

(Pittsburgh Suit tried before Judge Orr, but not yet decided.)

UNITED STATES DISTRICT COURT,

SOUTHERN DISTRICT OF NEW YORK.

50

GEORGE E. VANDENBURGH, Plaintiff, vs. CONCRETE STEEL COMPANY, Defendant.	In Equity. 14-88. Reissued Letters Patent 14,182.

EXCERPTS FROM TESTIMONY

In the case of

VANDENBURGH *v.* ELECTRIC WELDING CO.

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Stipulated into Case at Bar.

Witnesses.

Vandenburgh ..... pp. 18
Cummings 25
Kahn 28
Blethyn 32
Thayer 35
Chester 41

52 *Plaintiff's Exhibit No. 4.*

Testimony of Vandenburgh given in

VANDENBURGH
v.
ELECTRIC WELDING COMPANY,

In the United States District Court
for the Western District of Pennsylvania.

PRIMA FACIE PROOFS

53 GEORGE E. VANDENBURGH testified as follows:

Q. 1. Give your age and place of residence? A. My age is fifty-four; my residence is San Francisco.

Q. 2. Where are you staying at the present time? A. In Washington, D. C., 1803 Oregon Avenue.

Q. 3. Are you the George E. Vandenburgh who obtained U. S. Letters Patent 841,741, January 22, 1907? A. I am.

Q. 4. Will you state whether or not you made your invention prior to May 9, 1906? A. My first models, the first working out of that, was in the
54 fore part of February, 1903.

Q. 5. Will you state whether or not you regularly made and filed, on the 9th day of May, 1906, an application for patent on said invention, in United States Patent Office? A. I made application on May 9, 1906.

Q. 6. And was the patent duly and regularly issued upon said application? A. The patent was duly issued and delivered to me at San Francisco, January 22, 1907.

Q. 7. Did you or not, on or about July 1, 1916, make application to have said patent re-issued? A. I did.

Plaintiff's Exhibit No. 4. 55

Q. 8. For what reason did you make said re-issue application? A. Why, there were several mistakes in the wording of some of the claims. And one claim was so broad that it called for any kind of a fastening; whereas, I claimed that I invented a spur or integral fastening; and I wanted to limit it to my invention and not include the other. And one word was "end" instead of "edge".

Q. 9. Will you state whether or not such errors and inaccuracies were intentional or unintentional upon your part? A. They were unintentional upon my part. 56

Q. 10. Is the construction disclosed in the patent and re-issue of the patent of much or little value in the construction of concrete buildings? A. It is of great value in the construction of concrete.

Q. 11. You have said that the construction of this patent has proved of great value. How do you know that? A. Because it is adopted by all the large companies throughout this country; in the principle buildings going up through the country, they are using reinforced concrete. It is used in bridges and warehouses. All kinds of construction they are putting up, they are using this tie. 57

Q. 13. Have you yourself put it into use? A. No, sir.

Q. 14. You never put it into use? A. No, sir.

Q. 15 Anybody representing you put it into use? A. No, sir.

Q. 16. Any licensee? A. Yes, sir.

Q. 17. And who is the licensee? A. The Concrete Steel Products of Chicago, I have a license to them.

58 *Plaintiff's Exhibit No. 4.*

Q. 18. When did that company begin to use what you say is the construction under the patent under your license, or under consent from you? A. Well, I can't say when they commenced to use those, but it was licensed last year.

Q. 19. But they had been using it before? A. Yes, sir.

Q. 20. And without your consent before that time? A. Yes, sir.

Q. 21. And you threatened them with a suit for infringement last year? A. Yes, sir.

59 Q. 22. And as the result of that, they took out a license? A. They settled and took out a license, yes.

Q. 23. You don't know when they began using it? A. No, sir. I have the amount they used.

Q. 24. The suit that you threatened against the Concrete Steel Products Company was in California, was it not? A. Yes, sir.

Q. 25. They had put up a building there? A. Yes, sir.

Q. 26. And the Concrete Steel Products Company thought it would be cheaper to settle with

60 you than fight that suit out in California?

Objected to by counsel for plaintiff as not proper cross-examination.

Objection sustained:

Mr. Winter:

Q. 27. Outside of the products which the Concrete Steel Products Company has made during the last year, has anyone else taken out a license under your patent? A. No, sir.

Q. 28 No one else has paid you any royalty? A. No, sir.

Plaintiff's Exhibit No. 4. 61

Q. 29. You have said that one of the reasons for re-issuing your patent was that some of the claims stated that the convolutions were rigidly fastened to the bar. When did you find out that that defect exised in your original patent? A. I found out several years ago; but I never have taken it up in a place where it should be taken up and go ahead with it.

Q. 30. What do you mean by several years ago? Does that mean two or three? A. Well, I first made a study of it trying to get it on the market after the earthquake in San Francisco I went 62
to Washington, D. C., and got there on the 21st of July, 1906, right after the earthquake. The final patent papers were delivered to me on the 7th of January.

Q. 31. And then at that time you discovered that the claims had in them the word "rigidly"? A. Not at that time—well, no.

Q. 32. When did you discover that? A. In 1909, along about that time.

Q. 33 You then discovered that they had in them the word "rigidly"? A. Yes, I got that from a concrete engineer in looking them over. 63

Q. 34. What has been your experience in concrete construction? A. Well, I have had quite a bit of experience in it, considerable, and I have been on buildings having charge of other branches of the construction, where a great deal of concrete and reinforcing has been used. I have had charge of putting it in in Philadelphia and in Washington, D. C., and in San Francisco. I have put in the Kahn system.

Q. 35. Do you or do you not understand the mechanical theory of concrete reinforcement? A. I do understand mechanical theory as far as a practical man, not as an engineer.

64 *Plaintiff's Exhibit No. 4.*

Q. 36. Have you ever studied the subject outside of your practical work? A. No, I have never studied it to any great extent. I have read some books on it, but my reading was quite limited.

Q. 37. What was your financial and physical condition during the year following the grant of your original patent? A. Well, my health was very poor at the time. I had been in Florida for my health, and I came back from Florida and went home. Then I went back to Philadelphia,
65 and I came back from Florida and I made my home in Washington, D. C., with a friend of mine, B. Blethyn, at 1803 Oregon Avenue.

Q. 38. But in the time following the grant of your patent, where did you go and what was your financial and physical condition in those years? A. Well, I was sick a great deal; and I had several falls; I have had six falls in my lifetime and I now wear a bandage. And I have lost a great deal of money. I was robbed in Washington just before I went to Florida. And with my sick spells and my financial troubles I wasn't prepared to push my patent.

66 Q. 39. In making your original patent application, did you have any intention of defrauding anyone or deceiving anyone in making the disclosure of your specification? A. I had not.

Q. 40. When did you first make the invention disclosed in your original patent application? A. In February, 1903.

Q. 41. Where were you then living? A. I was living at 1803 Oregon Avenue, North, Washington, D. C. I made my home with B. Blethyn.

Q. 42. Did you make any embodiment or ex-

pression of the invention at the time in any way? A. Did I make any model, or anything of a description?

Q. 43. Did you make a model? A. I did make a model at that time. I made several models.

Q. 44. How many models did you make? A. I think there were five or six, all told, made in different forms; worked them out.

Q. 45. Will you examine the original patent and drawings and tell me whether the models made were similar to or different from any of the drawings shown in that patent? A. Well, 68 they were similar to Figure 3 and Figure 4 and Figure 6.

Q. 46. What became of those models? A. They were destroyed last year in a fire in Washington, D. C.

Q. 47. Where were they? A. They were in existence up to last year, where I had them stored there in Washington.

Q. 48. In whose possession were they? A. B. Blethyn's room, and he had a fire and destroyed them. I had all my photographs stored there.

Q. 49. At the time you made these models, will 69 you state whether or not they were shown to any one? A. They were shown to Mr. Blethyn. He saw it while I was experimenting on them, making them and working them out.

Q. 50. When was this? A. In February, 1903. And I made them in his shop between Twelfth and Thirteenth Street off from G.

Q. 51. Did you make any drawings of the invention at that time or not? A. Well, I always sketch up rough workings with a pencil, on a piece of paper of what I am working on.

70 *Plaintiff's Exhibit No. 4.*

Q. 52. Do you know what became of those drawings? A. Oh, I never keep nothing like that. I never keep no file of nothing. I am moving around from one city to another in building, and I never keep nothing like that.

Q. 53. Who did you first consult with respect to the re-issuance of this patent? A. I first consulted Mr. Griffin in the early part of last year, in San Francisco, in 1916. That was on my return from Sacramento, where I had been working on buildings; and I returned from Sacra-
71 mento to San Francisco, and I dropped in to see Mr. Griffin on the subject.

Q. 54. What was the reason that you did not apply for a patent immediately after the invention? A. From 1903 to 1906, I have told you what my health was; my health was very poor, and I was out of work, and I had to help my mother a good deal, who was sick; and then I got married and I was to a good deal of expense in going to housekeeping; and then my mother died and I had to go on and bury her. I was put to all the expense of the funeral and doctors'
72 bills and everything. And I had to help my wife's mother all the time. And, altogether, I had no money to put into patents. And the concrete was merely getting on them. It hadn't gotten far enough advanced that anybody would take and put any money into it.

Plaintiff's Exhibit No. 4. 73

EXCERPTS FROM DEFENDANT'S PROOFS

ROBERT A. CUMMINGS testified as follows (on behalf of Defendant):

Q. 1. What is your connection with the Electric Welding Company? A. President.

Q. 2. Did you ever do any investigation work with regard to the best way of taking care of stresses and strains in reinforced concrete work? A. Yes.

Q. 3. About when did you do that? A. The 74
study of reinforced concrete occupied my attention from 1893 continuosly to the present time. And the work of development has been practically continuous. I was more actively identified with actual testing on large structures in 1902, '3 and '4. Then I actually built the structurers and tested them. And I conducted a series of investigations with Prof. Turmeaure of the University of Wisconsin at Madison. The work was done at Pittsburg and vicinity.

Q. 4. To what extent did you at that time familiarize yourself with the technical literature 75
on this subject? A. I read everything that was printed in England and a good deal in this country.

Q. 5. I show you copies of four U. S. patents numbered, respectively, 764,883, dated July 12, 1904, for Metal and Concrete Column; 815,409, dated March 20, 1906, Concrete and Metal Structure; 822,587 of January 5, 1906, for Metal Reinforced Column; and 828,931 of August 21, 1906, for Concrete Column and the like. Are you the Robert A. Cummings, the patentee of these patents? A. Yes.

Q. 6. With reference to the various column re-

76 *Plaintiff's Exhibit No. 4.*

inforcements of your own design which you testified to, using independent hoops or bands, would these collapse in the sense that Mr. Vandenburg was referring to this morning? A. They do not collapse.

Q. 7. How does the cost of flat hoop reinforcement compare with the reinforcement of smaller size and spacing, using continuous spirals? A. The method that I effected was more expensive. We could not compete with the spiral continuous winding.

77 Q. 8. Do you know when in your work you used a continuous spiral for column reinforcement? A. I do not recall the exact date. But in my work, I believe, it must have been in the neighborhood of 1907 and 1908, along in that neighborhood somewhere. I do not remember the exact dates. I remember using it for some piles —some concrete piles that I drove at Chester, Pa. I drove those piles at Chester during the year, 1907.

Q. 9. Did you use longitudinal rods in these piles? A. Yes.

78 Q. 10. How were the rods and spirals fastened together, if at all? A. They were attached by the spacing bars that I have spogen about and also by wire.

Q. 11. When did the Electric Welding Company first manufacture the column reinforcement consisting of a spiral with two oppositely disposed vertical bars, such as shown in Plaintiff's Exhibit No. 1? A. Some time during the year 1911.

Q. 12. Mr. Cummings, out of the four patents presented by you and offered in evidence as your own patents, I understand none of them in

any way discloses anything at all with respect to spiral reinforcing. A. None whatever.

Q. 13. When you were using a series of hoops, you must have welded or riveted the joint for each hoop, must you not? A. Yes.

Q. 14. This would make an enormous number of joints in a good-sized building, would it not? A. Yes.

Q. 15. In the same building, if spirals were used in place of hoops, there would be only a few joints and those few would be easily made, would they not? A. Yes. 80

Q. 16. Then this would be an advantage in that form of construction? A. Yes.

Q. 17. A practical advantage or a commercial advantage, of great commercial advantage in fact? A. Yes, of great commercial advantage.

Q. 18. The possibility of collapsing the spirals is of considerable advantage in shipping, is it not? A. In shipping, yes.

Q. 19. And that is still a further advantage? A. No, sir, that is the only advantage they have, otherwise, they are a disadvantage.

Q. 20. Do you mean to say that the advantage you told us about the joint has now disappeared? 81
A. No, sir, not necessarily. That is incidental, just like collapsing. The other is not incidental.

Q. 21. In other words, there is an advantage in only having a few joints? A. Collapsibility is incidental to that type of construction.

Q. 22. Is it not also true that as a manufacturing proposition, it is much easier to make a single long spiral than a series of rings? A. Yes.

82 *Plaintiff's Exhibit No. 4.*

Q. 23. Is it not also true that it is easier to assemble the spiral unit than a unit made of a series of rings? A. No, you have the same number to put down in each case.

Q. 24. But would it not be more convenient to put up a bundle of longitudinals than to pick up a number of separate rings? A. We have not found it so.

Q. 25. Will you tell me why you abandoned the use of rings and adopted the spirals? A. Because of the joint.

83 Q. 26. Then there is a gain by that change? A. Yes, a manufacturing gain.

Q. 27. What experience had you, or your own knowledge, of spirals with integral fastenings to longitudinals in use prior to 1907 and 1908? A. No practical experience, except what I obtained from books.

Q. 28. And prior to that time, contractors used wires to secure the spirals to longitudinals? A. As far as I know, they did, yes.

JULIUS KAHN, testified as follows (on behalf of
84 Defendant):

Q. 1. What has been your experience as a concrete engineer? A. I graduated from the University of Michigan in 1896 and began the practice of reinforced concrete in 1902. In 1903, I organized the Trussed Concrete Steel Company of Michigan, of which I was elected the President, and have been connected with it since that time. The work of our own company consists of the designing of reinforced concrete structures and the furnishing of reinforcement for such buildings. During the years 1903 to 1907, we were contractors for reinforced concrete build-

ings. During all of that time we probably designed many thousand of buildings.

Q. 2. Has the Trussed Concrete Steel Company ever manufactured and sold column reinforcements? A. To a very large extent, running into thousands of tons.

Q. 3. When did you begin to manufacture and sell column reinforcements of the hooped type? A. My first authentic case, where I can place the column would be 1907.

Q. 4. In this particular case, do you know how the spirals were secured to the longitudinals? 86
A. They were wired to them.

Q. 5. When did the Trussed Concrete Steel Company begin to use, if ever, the integral connection between the longitudinals and spirals? A. I would say in 1907.

Q. 6. How do you fix that date? A. Through a circular issued in 1907 and bearing date December 17, 1907.

Q. 7. When did you first begin to use round metal spirals? A. The circular indicates the round as well as the flat, if you will read the joint members used for the column hooping directly above the picture. It says ½ by ¼ inch 87
flats as well as No. O wire.

Q. 8. About what is the diameter of No. O wire? A. About a quarter of an inch.

Q. 9. Were these reinforcements collapsible? A. They were.

Q. 10. When did you first learn of collapsible column hooping of this general type consisting of spirals connected to longitudinal members? A. As far as I can remember that we ever made this hooping we collapsed it for shipment.

Q. 11. About when was that? A. The earliest I can trace it back would be 1907. That would be the date of that circular.

88 *Plaintiff's Exhibit No. 4.*

Q. 12. Was anybody else making that at that time? A. Yes, they were used and sold quite generally by the Smith Iron & Wire Works of Chicago. I don't remember exactly when the American people put their column hooping into general circulation, but I think it was about that time.

Q. 13. Was the use of spiral hooping embodying longitudinal members, having integral fingers to hold the spirals into the kerfs, a matter of common knowledge among engineers at that
89 time? A. It was, and was used in all material shipped by the Smith Iron & Wire Works.

Q. 14. How do you know that the Smith was shipping them? A. Met them in competition.

Q. 15. When, relative to your first work? A. I would not be too sure about that answer—I think it was about 1907 or 1908.

Cross-examination:

xQ. 16. Mr. Kahn, you are very much interested in this case in assisting to defeat this pat-
90 ent and re-issue, as president of a company which is being sued by this plaintiff, and you have expressed very decided opinions adverse to this patent and its re-issue, have you not? A. Yes, sir.

xQ. 17. How much, roughly, of spiral reinforcings with spacing bars and integral means for securing the spirals thereto has your company made within the last six years?

(Question objected to and not answered.)

xQ. 18. You make spirals of this type with longitudinal reinforceing bars yourself, do you not? A. We do.

xQ. 19. And you find considerable advantage

in the use of such reinforcing? A. I think I made a mistake in my earlier answer. We don't make spirals with such bars to be used as reinforcing bars. And we do not make the construction shown in the Vandenburg patent. Does that answer your question?

xQ. 20. No ,sir, it doesn't? A. Then, I do not correctly understand it. I will tell you what we do make, is that what you wish to know?

xQ. 21. Very good. A. We manufacture column hooping consisting of spiral coils held together with spacing bars, which spacing bars have 92 notches therein for receiving the coils, the whole making a cage wherein the spirals are as nearly at right angles to the main bar as possible; wherein the bars hold the spirals at the proper distance apart, and these are not intended as reinforcement, the reinforcement consisting entirely of the spiral, which acts as a pipe around the concrete mass.

xQ.22. Is it not a fact that these spirals are held in these notches that you have spoken of by means integral with the longitudinal spacing bars? A. Yes.

xQ. 23. And do you mean to sit there and tell 93 me that you can put three-quarter inch steel longitudinals into another structure and not reinforce it in the manner you have just mentioned? A. We do not use the three-quarter inch steel spacing bars.

xQ. 24. What kind do you use? A. We use a little T, which has an area equivalent, I would say, to about three-eighths of an inch bar.

xQ. 25. Is it not a fact that in the San Diego job you used one and one-quarter inch bars? A. I don't remember what job you are talking about.

94 *Plaintiff's Exhibit No. 4.*

xQ. 26. The San Diego large bridge? A. Yes, I do remember. You mean in the Exposition.

xQ. 27. Yes. A. I have some samples of the bars we used there right here.

xQ. 28. And do you mean to say that when these spacing bars are put in a concrete construction, they don't reinforce it? A. They are not intended to reinforce it.

xQ. 29. Never mind that, just answer my question. A. We do not use them in our calculations—

95 xQ. 30. That is not the question. A. They might, by accident, lend some reinforcement. They are intended as spacers and not reinforcers.

xQ. 31. They do actually reinforce the concrete? A. Yes, I suppose, to some slight extent.

xQ. 32. Will you examine the patent No. 992,970 to McClure, of May 23, 1911, and examine Figure 4, and tell me, whether or not the reason for placing these two bars at opposite ends of the spiral and not contracting with each other in pairs is for the purpose of providing for its collapsibility? A. Yes, it is for that purpose in that

96 case.

Rebuttal

Benjamin Blethyn (on behalf of plaintiff), testified as follows:

Q 1. What is your age and place of residence? A. My age is fifty-five. My residence, 1803 Oregon Avenue, Washington, D. C.

Q 2. What is your occupation? A. Contractor and builder.

Q 3. How long have you been engaged in contracting? A. About thirty years.

Q. 4. What kind of contracting? A. General; all kinds of building construction.

Q. 5. Did you ever make any reinforced concrete building? A. Oh, yes.

Q. 6. How many? A. Several. About eight or ten different buildings, some large, some small.

Q. 7. When did you first know Mr. Vandenburgh? A. About twenty-five years ago.

Q. 8. Do you know where he was living in February, 1906? A. Yes; he was living in my house.

Q. 9. Did you ever know that he had a patent on a reinforcing for concrete? A. I saw him 98 working it out, yes, sir.

Q. 10. When? A. In 1903.

Q. 11. What time in 1903? A. The first part of it; about January or February; I am not certain of the exact date; I think it was in February.

Q 12. What did he do actually? A. First of all, he made a model of it out of wood with wire reinforcing in it. He made it out of wood first, and he got it to suit him, and then he made it out of steel.

Q. 13. How many models did he make, do you know? A. Oh, I seen several around there, prob- 99 ably four or five different kinds.

Q. 14. When? A. In 1903.

Q. 15. Were there four or five of these models in 1903? A. Yes, sir.

Q. 16. Do you know where those models are at the present time? A. Yes; I know where they've gone to now. But they were in my house up to November of last year, and I had a big fire in my cellar, and all the models and all his photo-

100 *Plaintiff's Exhibit No. 4.*

graphs and several other things were in my cellar —I had considerable lumber in there, and the Fire Marshal ordered everything cleared out.

Q. 17. How do you fix the time at which these models were made? A. During that time they were re-modeling a building next door to my shop, at 72 Thirteenth Street—I have been there eleven years, I think; and the owner of the building sent for the insurance people to examine the building; and they found this carpenter shop on the first floor, and the next day we got notice to
101 cancel our insurance. They didn't know there was a carpenter shop there; and I got notice to move. So I was obliged to go back to the Builders' Exchange in an alley. I couldn't get a place for a carpenter shop on a main street, on account of the insurance.

Q. 18. Is that the way you fix the date? A. Yes, sir.

Q. 19. Are you familiar with drawings? A. Yes, sir.

Q. 20. I hand you a copy of the Vandenburgh patent, 841,741, dated January 22, 1907, and ask
102 you if you understand the construction delineated there? A. Yes. I can recognize Figure 1, Figure 4, and Figure 6 very clear.

Q. 21. Do you know whether the models that you saw at that time were the same as or different from the constructions that are delineated upon that drawing? A. They are as near as I possibly can recall—probably a little more crude than usual, but they were just about the same.

Q. 22. And what figures do you refer to? A. Figures 1, 4 and 6. In fact, I can recognize them all, as far as that goes.

Q. 23. What is your experience in the construc-

tion of concrete buildings and concrete of all kinds? A. Well, I haven't had such a great deal of experience in concrete construction myself, but I have had a good deal of experience in buildings. My principal work is re-modeling business houses, but I manufacture and have done a good deal of concrete work. In one building, I had a contract for $65,000, the Bristol School.

Q. 24. Were these girder columns reinforced or plain? A. Reinforced.

Q. 25. Who designed these columns? A. I did.

Q. 26. Do you not understand the designing 104
of reinforced concrete? A. No, not as a practical engineer. As far as building goes, I think I do, as much as anybody else.

Q. 27. As a practical builder, do you consider that you could take the reinforcing shown there and produce satisfactory buildings? A. Oh, yes; I don't see why not.

Prof. Horace R. Thayer (on behalf of plaintiff) testified as follows:

105

Q. 1. What is your age, and where is your place of residence? A. My age is forty-four; my residence is Pittsburgh.

Q. 2. What is your occupation? A. Civil engineer.

Q. 3. What line of civil engineering do you follow? A. Structural engineering. I am assistant professor of designs at the Carnegie Institute of Technology, and I have done considerable outside work.

106 *Plaintiff's Exhibit No. 4.*

Q. 4. How much designing for concrete buildings have you done? A. I have done some. My first design in concrete work was, I think, about 1907. I have done some since then.

Q. 5. And are you familiar with that art? A. Yes. I think my first connection of any kind with reinforced concrete work was about 1903. At that time, concrete was just beginning to be used, and I had to teach and look it up. I was associated with Prof. Merriman, at that time, a well-known expert in cement. He was an ex-
107 pert on this matter, and he took a very active interest in it, and he discussed the matter, and I had the pleasure of reading his manuscripts. We had many discussions regarding the action of reinforced concrete.

Q. 6. Have you written anything on the subject of reinforced concrete? A. I have published a lecture on "Failures of Masonary" that took up some things in connection with reinforced concrete. I have presented an article before the Engineers' Club of Baltimore on reinforced concrete arches. And I have a partly written article on
108 the subject. That's all I recollect.

Q. 7. Are you familiar or not with drawings? A. Yes.

Q. 8. I hand you a copy of the Vandenburgh patent, 841,741, dated January 22, 1907, and ask you whether, in your judgment as an engineer, you could, with that drawing before you, produce, as a matter of mere engineering skill, reinforcing for different size girders, columns, slabs, or other reinforced concrete work?

By the Court: Is that disputed?
Mr. Winter: I don't think so.

Mr. Griffin: I think it is. These gentlemen have said that this is limited—they confine their case, in fact, to their statement that this was intended only for slabs.

By the Court: *Well, I should find it otherwise from the patent itself. And I don't think they have insisted upon that.*

Mr. Griffin: Very good your Honor.

Q. 9. I will now hand you a copy of a patent to Rebert Kieserling, No. 73,004, a German patent and asked if you believed it commercially possible 110 to assemble a column having a considerable number of the usual commercial reinforcing spirals such as are illustrated in Figure 5, according to the manner of Figure 7-b? A. No. The expense of it would be prohibitive in a practical way.

Q. 10. Just why do you say that? A. Well, you would have to punch holes in that shape there, and you would have to thread the spiral through them. And I cannot see any practical way in which it could be done at any reasonable cost. You understand that reinforced concrete is such 111 a competitive business that anything that costs more money than some other method *simply goes right out of use immediately.*

Q. 11. If a column were so assembled and provided with a considerable number of spiral reinforcing—spirals with nine or more longitudinal bars, such as are illustrated in Figure 6 of the same drawing, do you think it would be possible to collapse that structure or not? A. Well, as a general proposition, it would not. It would depend a little bit on the method of fastening. As a general proposition, it would not be.

112 *Plaintiff's Exhibit No. 4.*

Q. 12. Do you or do you not find any integral prongs in this patent for securing the longitudinals to the spirals? A. I do not, no, sir.

Q. 13. I will show you patent 822,587 to R. A. Cummings of June 5th, 1906, and ask you if you have ever seen that before? A. I have seen the patent, yes, sir.

Q. 14. Would you consider that it required any great designing or engineering ability to produce a properly reinforced column with this Vandenburgh patent before you? A. Only the ordin-
113 ary designer's ability.

Mr. Winter:

Q. 15. Now, in discussing the German Kieslerling patent, you stated that that patent showed no integral prongs for holding the spiral in position? A. Yes—that one.

Q. 16. As far as the effect of the structure in concrete is concerned, would it make any difference whether you had integral prongs or whether you had the arrangement shown in Figure 7-b, where the spirals extend through holes in the
114 longitudinal bar? A. I would have a slight preference for the latter figure, Figure 7-b.

Q. 17. Now, as to these integral prongs, of which considerable has been said, what do you understand is their purpose in these hooped column constructions, and what is their advantage? A. Well, the usual procedure in practice is to build a hollow shell in which the reinforcement is placed, and then the concrete is poured in on top of it. Now, if this reinforcement is not well held in position the concrete will displace it, and it will prevent it from carrying out the functions that we have assumed that it would.

115

Re-direct Examination by Mr. Griffin:

Re-D.Q. 18. Do you think steel bars in columns for longitudinals would ever be placed outside the spirals to be of any value in reinforced concrete? A. They ought not to be so placed.

Re-D.Q. 19. If there is a slight oval form to the spirals, or even a considerable oval form, does that destroy their reinforcing effect? A. No, sir, it does not.

Re-D.Q. 20. What determines the number of longitudinals to be used and their size in any given instance? A. They can be of various sizes. They may vary from a very small amount, sufficient to hold the hoops in place, on up to a large amount, say two, three or even four per cent. of the columns; four per cent., though, is likely to be uneconomical.

116

Re-D.Q. 21. Has the securing of spirals by some means integral with the spacing bars any marked advantages? A. Yes, it holds the steel firmly in position while the concrete is being poured.

117

Re-cross Examination by Mr. Winter:

Re-xQ. 22. As an engineer for column construction, would you prefer a reinforcement with only one longitudinal bar, as shown in Defendant's Exhibit "W", or would you prefer bars symmetrically arranged with reference to the axis of the column? A. I would prefer more than one bar.

Mr. Griffin:

Re-xQ. 23. But that preference would be merely a matter of design, would it not? A. Yes.

118 *Plaintiff's Exhibit No. 4.*

By the Court:

Re-xQ. 24. As I understand you, the concrete is able to resist compression force when it sets ordinarily. And the use of the reinforcing material is to introduce a tensile material that will protect the concrete from injury and from other stresses than compression stresses? A. Yes, sir.

Re-xQ. 25. And it depends upon the tensile strength of the material and its grasp on the concrete, as to whether or not it is going to protect the shearing or the other stresses? A. I
119 think that is correct, your Honor.

Re-xQ. 26. And a great deal of modern construction is made, both of columns and beams and floor construction, with loose and unconnected pieces of metal, either in the shape of rods or bands, and placed so that there would be some grasp either of the rod upon the concrete or the concrete upon the rod? A. In modern construction, they are getting now more and more to the idea of fastening them together. A great deal of trouble is caused in actual construction by displacement.

120 Re-xQ. 27. I understand. That is simply to hold it together until the concrete is placed around it. That is the main purpose, isn't it? A. Yes; the concrete gets a very weak grip on the steel, and, in order to reinforce it, some form of reinforcement has been introduced. The main trouble with concrete that I have had has been in the line of shear, which this arrangement here, and various other devices, are to protect.

Plaintiff's Exhibit No. 4. 121

JOHN M. CHESTER (on behalf of plaintiff) testified as follows:

Q. 1. What is your age? A. Fifty-two.

Q. 2. Place of residence? A. Pittsburgh, Pennsylvania.

Q. 3. And what was your early education? A. Graduate of the University of Illinois in Civil Engineering.

Q. 4. Any other education? A. Well, I had a preliminary education at high school.

Q. 5. And what are you doing at the present 122
time? A. Practicing the profession of civil engineering for thirty-five years.

Q. 6. Where? A. Twenty years of that time in Pittsburgh.

Q. 7. What kind of structures do you erect? A. All types called for in the building power houses, water and sewer purification, and bridges.

Q. 8. Ever erect any reinforced concrete buildings? A. A great many.

Q. 9. What kind? A. Well, I would limit that not to reinforced concrete throughout, but reinforced members of framework and reinforced 123
bridges.

Q. 10. How long have you been erecting reinforced concrete buildings? A. In 1905 and '6 I erected the first structure.

Q. 11. Who designed it? A. It was designed by myself, and under my direction, by a draftsman.

Q. 12. You have testified as an expert in cases before this? A. I have.

Q. 13. Do you understand the matter of patent office drawings and specifications? A. I think I do.

124 *Plaintiff's Exhibit No. 4.*

Q. 14. I will show you two copies of patents, one Patent No. 822,587, to Cummings, of June 5, 1906, and a copy of the reissue patent, 14,182 to Vandenburgh, of August 15, 1916, the original of which is patent 841,741, January 22, 1907, and ask you if you understand the construction therein outlined? A. I believe I do.

Q. 15. Regardless of the date of each patent, which do you deem the most advantageous type of construction in the art? A. In my opinion, the Vandenburgh permits the more advanced con-
125 struction of the art.

Q. 16. Could any competent engineer design columns, girders, or floor slabs with the Vandenburgh patent before him, to carry different loads in those slabs and columns, which are of different sizes and lengths, without the exercise of anything more than the usual skill of a draftsman or an engineer? A. I think they could.

Q. 17. Has that particular type, the spiral with the longitudinal bar inside the spiral and secured to the spiral, any particular or definite advantages? A. It has.

126 Q. 18. What are they? A. They are principally commercial. To obtain the same strength and utility, it is cheaper to construct.

Q. 19. Are there other advantages mechanically in securely fastening the coil to the bar? A. There are. The necessity arises for some method of fastening the coil to the bar, for supporting and maintaining the coil in its natural condition during the process of introducing the concrete; and also adding further strength to the structure in some types or designs in which it is employed.

Cross-Examination by Mr. Winter:

xQ. 20. You have stated that the construction of the Vandenburgh patent allows the obtaining of strength and uniformity, which would cheapen the cost. With what were you comparing it when you made that answer? A. With other types of construction, such as the band or the hoop.

xQ. 21. Of the Cummings patent, which is before you? A. Yes.

xQ. 22. You had that specifically in mind? A. 128
Yes, sir.

xQ. 23. What is there in the Vandenburgh construction which enables you to get a strength and uniformity that is cheaper in cost of construction than the Cummings construction? A. The spiral compared with the hoop. The spiral needs no welding or clip fastening or hook. If the strength of the hoop is provided in the hook or joint. It becomes much more expensive than the same strength if obtained through the spiral.

xQ. 24. Is it your position that a spiral hooping has the same efficiency and utility as a horizontal hooping, or that the members have the 129
same strength? A. Well, I would defer to the hoop, a differential over the spiral. With the same gauge of material.

xQ. 25. As far as strength is concerned? A. Yes, sir.

xQ. 26. And, as far as resisting the tendency of the column to fracture? A. Inferentially, I think so.

xQ. 27. So the problem comes down to whether you would use continuous hoops with their slight differential in favor of utility, as compared with the spiral, on account of the greater cheapness

130 *Plaintiff's Exhibit No. 4.*

of the spiral? A. It is a commercial proposition wholly.

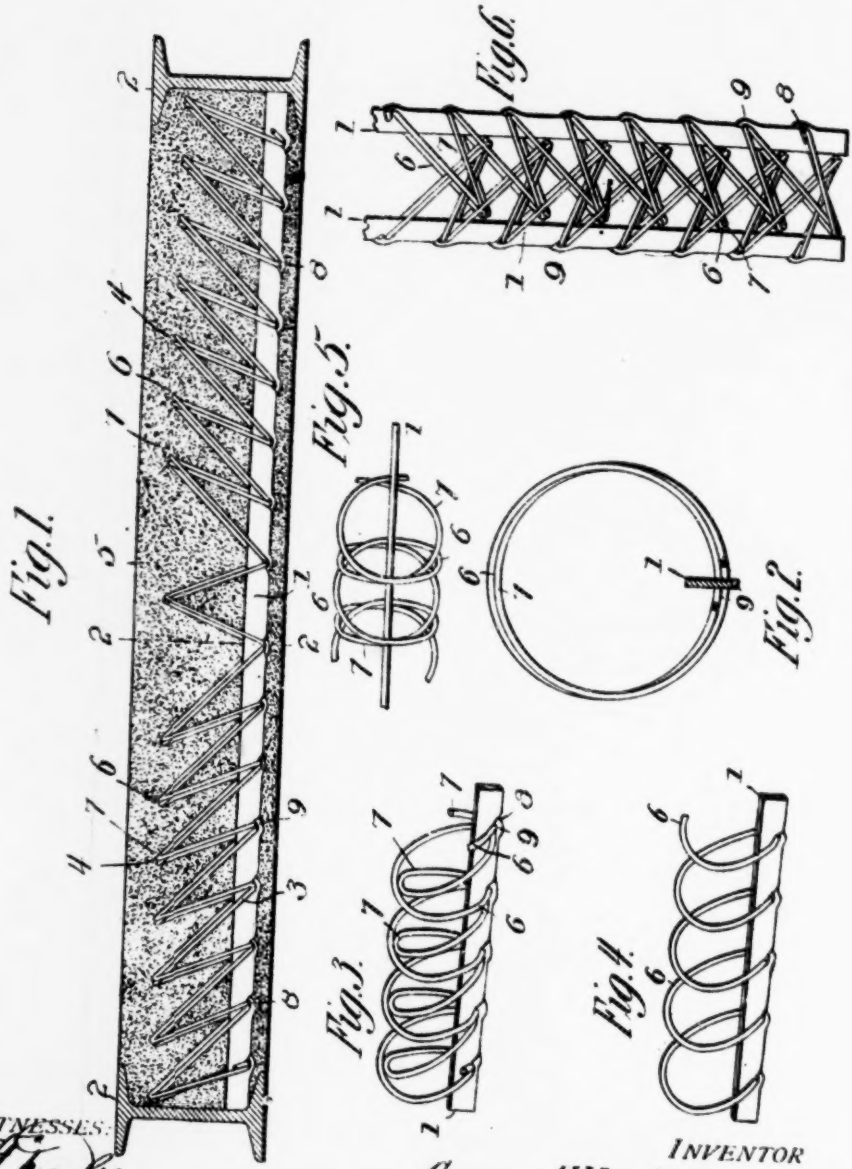
xQ. 28. As an engineer, is there any advantage in using a hoop which is formed of metal of round cross section, as compared with one that is bored and flat, such, for instance, as the hooking in the Cummings patent? A. The round being drawn, the flat being rolled, the round is always the stronger metal in tensile strength than the flat. And, therefore, somewhat less material may be employed. In other words, wire is
131 stronger than rolled bands.

No. 841,741.

G. E. VANDENBURGH. PATENTED JAN. 22, 1907.

REINFORCING BAR.

APPLICATION FILED MAY 9, 1906.



WITNESSES:

W. F. Kopke.

Alfred T. Gage

INVENTOR

George E. Vandenburgh,

BY E. B. Stocking

Attorney

UNITED STATES PATENT OFFICE.

GEORGE E. VANDENBURGH, OF WASHINGTON, DISTRICT OF COLUMBIA.

REINFORCING-BAR.

No. 841,741. Specification of Letters Patent. Patented Jan. 22, 1907.

Application filed May 9, 1906. Serial No. 315,959.

REISSUED

To all whom it may concern:

Be it known that I, GEORGE E. VANDENBURGH, a citizen of the United States, residing at Washington, District of Columbia, have invented certain new and useful Improvements in Reinforcing-Bars, of which the following is a specification, reference being had therein to the accompanying drawings.

This invention relates to a reinforcing-bar particularly adapted for cement and concrete construction wherein the bar is embedded in the plastic body to be supported thereby.

The invention has for an object to provide a reinforcing-bar with one or more spirally-disposed coils secured to the bar so as to provide an extended area of contact adapted to resist strain longitudinally and laterally of the bar and to form a truss within the body of concrete or other plastic material which provides the maximum of supporting strength in the arch or surface to be formed.

Other and further objects and advantages of the invention will be hereinafter set forth, and the novel features thereof defined by the appended claims.

In the drawings, Figure 1 is a vertical section showing the bar applied to supporting girders or beams. Fig. 2 is an enlarged vertical section on the line 2 2, Fig. 1. Fig. 3 is a detail perspective of the primary and secondary coils shown in Fig. 1. Fig. 4 is a similar view of a modified form using one coil. Fig. 5 is a detail plan of the form shown in Fig. 3, and Fig. 6 is an elevation of two meshing coils used for girder and column construction.

Like numerals of reference indicate like parts in the several figures of the drawings.

The numeral 1 designates a bar which may be of any desired construction or configuration and supported in any preferred manner. For instance, when used in arch construction it is adapted to rest upon the base of the beams or girders 2 sufficiently above the lower surface thereof to provide for the facing of the concrete or cement beneath the lower face of the bar. The coils 4 are secured to the bar in any desired manner—for instance, as hereinafter described—and the plastic material or cement-filling 5 applied so as to surround the coils and bar and embed the same therein to form a truss construction.

The bar may be provided with a primary coil 6, extending in one direction, as shown in Fig. 4, which is sufficient in light construction; but when a heavier construction is to be used a secondary coil 7 is provided, which extends in the opposite direction to the coil 6 and through the same so as to cross beneath the coil 6 at a point directly above the bar, thus providing a construction in which all lateral pull or strain of the coil is avoided, owing to the equalization thereof by the oppositely-extending coils and the tendency of the coils to move or flatten toward the face of the bar resisted. This preferred construction is shown in Figs. 1 and 3, and it is also desirable that both of the coils be deflected away from the center of the bar, as shown in Fig. 1, as the greatest supporting strain carried by the arch is at the center thereof, and this deflection therefore resists such strain and tends to draw the coils upward into a position at right angles to the bar.

As a preferred means of securing the coils to the bar I have shown a series of kerfs 8 in one face of the bar inclined away from the center of the bar toward the opposite ends thereof, and the coils are seated within these kerfs and held therein by means of the integral spurs 9, which are forced downward upon the coils when inserted and permanently retain them in position.

In Fig. 6 a modified application of the invention is shown where two of the bars are disposed parallel to each other, with their coils intermeshing, for use in column or girder construction, wherein such a construction provides the maximum of strength with the minimum of weight in the reinforcing material.

In the operation of the invention it will be seen that the bar supporting the coil resists any movement thereof longitudinally of the bar and provides the necessary strength upon which the truss structure formed by the coils is carried. These coils being extended in opposite directions and embedded in the material provide the maximum strength to resist either lateral or longitudinal pressure with the minimum weight and quantity of material, as owing to their opposite direction of curvature they effectually oppose the strain placed thereon, while their deflection toward the opposite ends of the bar resists the central downward strain of the arch.

It will be seen that this form of bar is very simple and economical in construction

while embodying the greatest efficiency in use. This bar, although described in connection arch and column construction, is adapted for use in any character of metal, reinforced concrete, or cement construction.

Having now described my invention and set forth its merits, what I claim, and desire to secure by Letters Patent, is—

1. In a reinforcing-bar, a spiral coil rigidly secured thereto at two points in each convolution thereof and extended beyond and free of said bar at the opposite side therefrom to the securing-point.

2. In a reinforcing-bar, a spiral coil rigidly secured thereto at two points in each convolution thereof and extended beyond and free of said bar at the opposite side therefrom to the securing-point, said coils being deflected in opposite directions from the center of the bar toward the ends thereof.

3. A reinforcing-bar provided upon one end with a series of kerfs each having an integral overlapping spur, and a coil disposed in said kerfs, each convolution thereof being retained beneath one of said spurs.

4. A reinforcing-bar provided upon one edge with a series of kerfs disposed diagonally to the length of the bar each having an overlapping integral spur projected toward the center of the bar, and a coil disposed in said kerfs and retained beneath said spurs.

5. A reinforcing-bar provided with a spirally-disposed coil secured thereto and extended free of said bar, and a secondary spirally-disposed coiled strand secured to the bar and extending in the opposite direction to the first-mentioned coil.

6. A reinforcing-bar provided at opposite sides of its center with spiral coils secured thereto and deflected in opposite directions from the center of the bar, and a secondary spiral coil secured to the bar and extended in the opposite direction to the first-mentioned coil throughout the length thereof.

In testimony whereof I affix my signature in presence of two witnesses.

GEORGE E. VANDENBURGH.

Witnesses:

ALFRED T. GAGE,

JOHN L. FLETCHER.

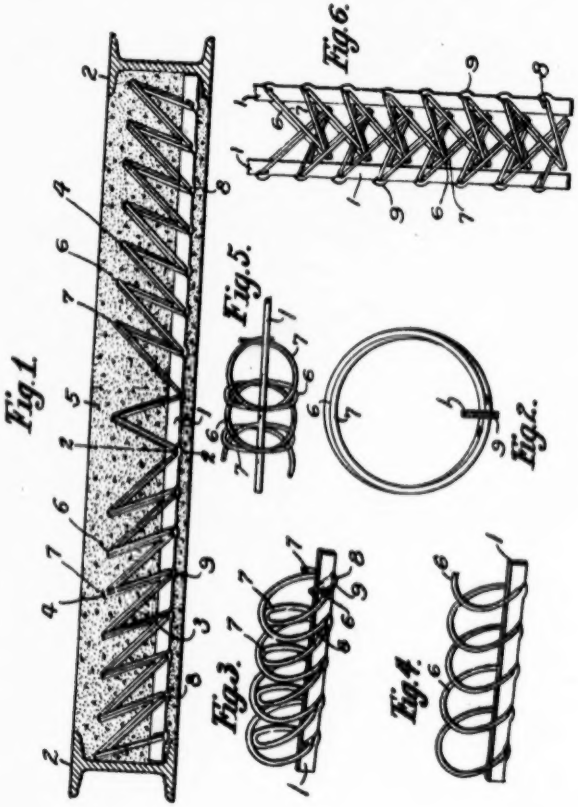
G. E. VANDENBURGH.

REINFORCING BAR.

APPLICATION FILED JULY 1, 1916.

Reissued Aug. 15, 1916.

14,182.



INVENTOR.
George E. Vandenburgh.

BY
Carlos P. Griffin
ATTORNEY.

UNITED STATES PATENT OFFICE.

GEORGE R. VANDENBURGH, OF SAN FRANCISCO, CALIFORNIA.

REINFORCING-BAR.

14,182. Specification of Reissued Letters Patent. Reissued Aug. 15, 1916.

Original No. 841,741, dated January 22, 1907, Serial No. 315,959. Application for reissue filed July 1, 1916. Serial No. 107,203.

To all whom it may concern:

Be it known that I, GEORGE E. VANDENBURGH, a citizen of the United States, and recently of Washington, District of Columbia, and now residing at San Francisco, California, have invented certain new and useful Improvements in Reinforcing-Bars, of which the following is a specification, reference being had therein to the accompanying drawings.

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The invention has for an object to provide a reinforcing-bar with one or more spirally-disposed coils secured to the bar so as to provide an extended area of contact adapted to resist strain longitudinally and laterally of the bar and to form a truss within the body of concrete or other plastic material which provides the maximum of supporting strength in the arch or surface to be formed.

Other and further objects and advantages of the invention will be hereinafter set forth, and the novel features thereof defined by the appended claims.

In the drawings, Figure 1 is a vertical section showing the bar applied to supporting girders or beams. Fig. 2 is an enlarged vertical section on the line 2—2, Fig. 1. Fig. 3 is a detail perspective of the primary and secondary coils shown in Fig. 1. Fig. 4 is a similar view of a modified form using one coil. Fig. 5 is a detail plan of the form shown in Fig 3, and Fig. 6 is an elevation of two meshing coils used for girder and column construction.

Like numerals of reference indicate like parts in the several figures of the drawings.

The numeral 1 designates a bar which may be of any desired construction or configuration and supported in any preferred manner. For instance, when used in arch construction it is adapted to rest upon the base of the beams or girders 2 sufficiently above the lower surface thereof to provide for the facing of the concrete or cement beneath the lower face of the bar. The coils 4 are secured to the bar in any desired manner—for instance, as hereinafter described—and the plastic material or cement-filling 5 applied so as to surround the coils and bar and embed the same therein to form a truss construction.

The bar may be provided with a primary coil 6, extending in one direction, as shown in Fig. 4, which is sufficient in light construction; but when a heavier construction is to be used a secondary coil 7 is provided, which extends in the opposite direction to the coil 6 and through the same so as to cross beneath the coil 6 at a point directly above the bar, thus providing a construction in which all lateral pull or strain of the coil is avoided, owing to the equalization thereof by the oppositely-extending coils and the tendency of the coils to move or flatten toward the face of the bar resisted. This preferred construction is shown in Figs. 1 and 3, and it is also desirable that both of the coils be deflected away from the center of the bar, as shown in Fig. 1, as the greatest supporting strain carried by the arch is at the center thereof, and this deflection therefore resists such strain and tends to draw the coils upward into a position at right angles to the bar.

As a preferred means of securing the coils to the bar 1 have shown a series of kerfs 8 in one face of the bar inclined away from the center of the bar toward the opposite ends thereof, and the coils are seated within these kerfs and held therein by means of the integral spurs 9, which are forced downward upon the coils when inserted and permanently retain them in position.

In Fig. 6 a modified application of the invention is shown where two of the bars are disposed parallel to each other, with their coils intermeshing, for use in column or girder construction, wherein such a construction provides the maximum of strength with the minimum of weight in the reinforcing material.

In the operation of the invention it will be seen that the bar supporting the coil resists any movement thereof longitudinally of the bar and provides the necessary strength upon which the truss structure formed by the coils is carried. These coils being extended in opposite directions and embedded in the material provide the maximum strength to resist either lateral or longitudinal pressure with the minimum

weight and quantity of material, as owing to their opposite direction of curvature they effectually oppose the strain placed thereon, while their deflection toward the opposite ends of the bar resists the central downward strain of the arch.

It will be seen that this form of bar is very simple and economical in construction while embodying the greatest efficiency in use. This bar, although described in connection with arch and column construction, is adapted for use in any character of metal, reinforced concrete, or cement construction.

Having now described my invention and set forth its merits, what I claim, and desire to secure by Letters Patent, is—

1. A concrete reinforcing consisting of a bar having a plurality of integral spurs, and a spiral coil permanently secured thereto by having the spurs bent down on the several coils, the coils extending beyond and free of the bar at the opposite side therefrom to the securing point.

2. A concrete reinforcing consisting of a bar having integral means to secure a coil thereto, and a spiral coil permanently secured to the bar in each convolution and extended beyond and free of said bar at the opposite side therefrom to the securing point.

3. A reinforcing-bar provided upon one edge with a series of kerfs each having an integral overlapping spur, and a coil disposed in said kerfs, each convolution thereof being retained beneath one of said spurs.

4. In a reinforcing-bar, a spiral coil permanently secured thereto by spurs bearing on each convolution thereof and extended beyond and free of said bar at the opposite side therefrom to the securing-point, said coils being deflected in opposite directions from the center of the bar toward the ends thereof.

5. A reinforcing-bar provided upon one edge with a series of kerfs disposed diagonally to the length of the bar each having an overlapping integral spur projected toward the center of the bar, and a coil disposed in said kerfs and retained beneath said spurs.

6. A reinforcing-bar provided with a spirally-disposed coil secured thereto and extended free of said bar, and a secondary spirally-disposed coiled strand secured to the bar and extending in the opposite direction to the first mentioned coil.

7. A reinforcing-bar provided at opposite sides of its center with spiral coils secured thereto and deflected in opposite directions from the center of the bar, and a secondary spiral coil secured to the bar and extended in the opposite direction to the first-mentioned coil throughout the length thereof.

In testimony whereof I have hereunto set my hand this 24th day of June, 1916.

GEORGE E. VANDENBURGH.

PLAINTIFF'S EXHIBIT "NO. 5"
Defendant's Catalog Page 6.

HAVEMEYER BAR SERVICE

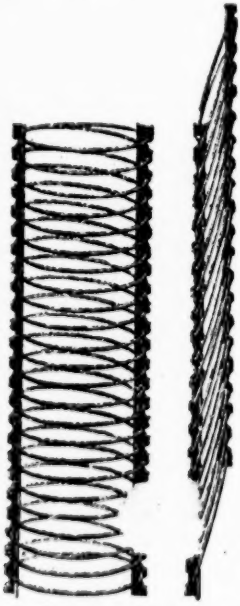
ENGINEERING.

Concrete Steel Company maintains experienced and efficient Engineering Departments in their District Sales Offices for the use of our customers. These Engineering Departments would be glad to co-operate in making up designs, estimates and plans on any type of reinforced concrete structure.

SHOP SERVICE AND BENDING FABRICATION.

Our warehouses and shops are equipped to economically bend bars to any desired shape and to fabricate into units ready to place in the forms. Shop bending is more accurate and less expensive than field bending. By using this service, the engineer and contractor may be assured of securing bars correctly bent, the bars being shipped to the work properly bundled and tagged, ready to place in the forms. The expense of a bending "gang" and bending tables on the job is thus entirely eliminated.

Collapsible Column



Collapsible Spiral

HAVEMEYER COLLAPSIBLE SPIRALS.

Havemeyer Collapsible Spirals are manufactured in our own shops, using a rigid spacer, and unless otherwise ordered, are equipped with two spacers and shipped collapsed. An angle spacer is used, the size varying with the size and weight of spiral. This type of spiral has proven the most economical and satisfactory.

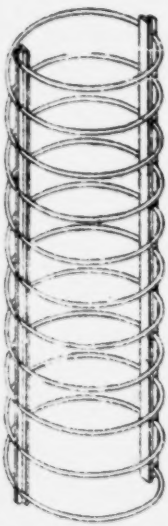
HAVEMEYER COLLAPSIBLE COLUMN.

The Havemeyer Collapsible Column is made up by using Havemeyer Bars for longitudinal members and for bands. The bands are attached to the longitudinal members by the use of Bar-Tys. These columns are shipped collapsed and are readily opened and set in place.

PLAINTIFF'S EXHIBIT NO. 7

Interlock Spiral Concrete Reinforcing

Spirals are five times as efficient as vertical steel in columns



Column set up ready for use

INTERLOCK SPIRALS have been used in millions of dollars' worth of buildings, one company has sold many thousands of TONS of them.

INTERLOCK SPIRALS may be used for columns or beams, and insure integral locking of EVERY SPIRAL at one-fifth the cost of hand wired joints.

INTERLOCK SPIRALS are stiff enough to save labor.

INTERLOCK SPIRALS insure machine precision in the field and unskilled labor can properly place and lock every spiral in LESS TIME than any other.

INTERLOCK SPIRALS can be shipped to you secured together and COLLAPSED as in the lower cut, if you wish, at the lowest freight rate.

INTERLOCK SPIRALS can be used with much or little OTHER REINFORCING as your specifications demand.

INTERLOCK SPIRALS have too many advantages to set forth in this short circular, and may be had of the **CONCRETE STEEL PRODUCTS CO., CHICAGO, ILL.**

There are many types of bars.

INTERLOCK SPIRALS can only be used where they bear the proper license tags under patent No. 841,741, Jan. 22, 1907, and reissue patent No. 14,182, Aug. 15, 1916; BASIC U. S. PATENTS on all forms of integral securing means for connecting the spacing bars to the spirals. All others are infringements and notice is hereby given to all users and manufacturers to discontinue the manufacture, use and sale of such bars immediately.

Suits in the United States District Courts for injunctions and accounting have been instituted against the **ELECTRIC WELDING CO., PITTSBURGH, PA., TRUSSED CONCRETE STEEL CO., YOUNGSTOWN, OHIO,** and **CONCRETE STEEL CO., NEW YORK, N. Y.** Other suits are to be entered against infringers, including users, as rapidly as the evidence can be collected. It is the intention of the inventor to vigorously protect himself against all unlawful piracy on the part of manufacturers and users of this reinforcing.

Pathetic pleas in a vain endeavor to beat the inventor are now being made.

Communicate with if interested

CARLOS P. GRIFFIN,
704 Pacific Building, San Francisco,
Attorney for G. E. Vandenburgh.

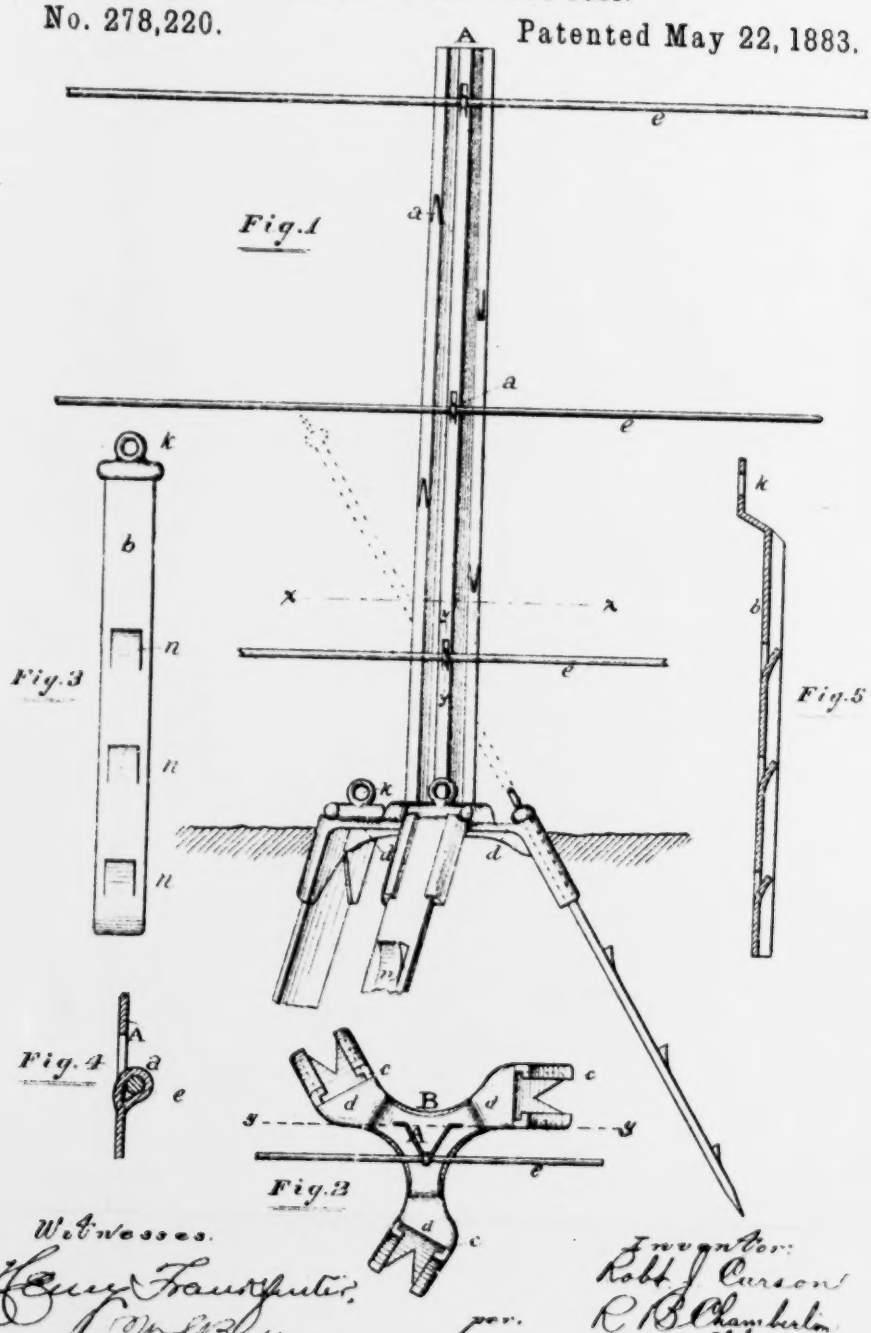
Column collapsed ready for shipment

(No Model.)

R. J. CARSON.

IRON OR STEEL FENCE POST.

No. 278,220. Patented May 22, 1883.



Witnesses.

Henry Frankfurter,

W. S. Baker

Inventor:

Robt. J. Carson

per. R. B. Chamberlin

Attorney

UNITED STATES PATENT OFFICE.

ROBERT J. CARSON, OF CHICAGO, ASSIGNOR OF ONE-HALF TO EDWARD RUTZ, OF SPRINGFIELD, ILLINOIS.

IRON OR STEEL FENCE-POST.

SPECIFICATION forming part of Letters Patent No. 278,220, dated May 22, 1883.

Application filed April 24, 1883. (No model.)

To all whom it may concern:

Be it known that I, ROBERT J. CARSON, of Chicago, in the county of Cook and State of Illinois, have invented certain new and useful Improvements in Iron or Steel Fence-Posts; and I do hereby declare the following to be a full, clear, and exact description of the invention, such as will enable others skilled in the art to which it pertains to make and use it, reference being had to the accompanying drawings, which form part of this specification.

My invention relates to an improvement in fence-posts, being particularly designed for the construction of barbed-wire fences; and it consists of a post that is formed from sheet metal, that is secured to a base having radial arms, which arms have at their outer ends downwardly-projecting annular bearing-grooves, in combination with pegs or braces of suitable construction, that are adapted to be driven through the grooves and into the ground for securing the posts thereto, the posts being provided with suitable means for attachment of the barbed wire, as will be more fully described hereinafter.

In the accompanying drawings, Figure 1 is a side elevation of a fence-post with its attachments complete. Fig. 2 is a cross-section on the line X X of Fig. 1. Figs. 3, 4, and 5 are detail views.

A represents a post formed of sheet metal, of any suitable thickness, and which is preferably triangular in cross-section, as shown in Fig. 2. This post is secured in any suitable manner to the base-plate B, which base-plate has projecting from it the radial arms D, the outer ends of which are inclined at a suitable angle downward, and have their inner sides in a line with the adjacent side of the angle formed by the post, as shown at Y Y, Fig. 2. These downwardly-turned projections are provided with a suitable groove, *c*, which adapts them to receive the pegs *b*, that are adapted to be driven through them and forced into the ground for securing the post in position. In order to anchor these pegs more firmly in position when driven into the ground, they are provided with barbs *a*, which may be either stamped out from the pegs, (which are preferably made of flat sheet metal,) or they may be cast thereon, if preferred. The tops of these pegs have secured to them the rings K, through which a crow-bar may be passed to secure leverage when it is desired to draw the pegs from the ground in order to remove the post. In order to secure the barb-wires to the post, I provide the post with ears *a*, which may be stamped therefrom or riveted thereto, and which ears are adapted to be bent over the wire *c*, as shown in Fig. 4.

A fence-post thus constructed is light, and is cheaply made, will be found exceedingly durable, and may easily be removed, after having been put in position, when it is desired to move the fence.

Having thus described my invention, I claim—

1. The combination of a fence-post of suitable construction, a base-plate, B, provided with radial arms *d*, turned-down ends having grooves *c* formed in them, and pegs *b*, that are adapted to secure the base-plate in position by being driven through the grooves, with which they are provided, into the ground, substantially as described.

2. The combination of the post A, formed of sheet metal, and provided with ears *a* for securing the wires thereto, a base-plate, B, having radial arms *d*, and the turned-down ends having grooves *c*, these ends being arranged so as to have their inner sides in a line with the adjacent side of the fence-post, and pegs *b*, that are adapted to be driven through the grooves and into the ground for securing the base-plate in position, the said pegs being provided with barbs, substantially as set forth.

In testimony whereof I affix my signature in presence of two witnesses.

ROBERT J. CARSON.

Witnesses:
A. B. TALLMAN,
WILLIAM H. MCGUIRE.

(No Model.)

C. PRESCOTT & M. H. BENNETT.

SAND SCREEN.

No. 447,162. Patented Feb. 24, 1891.

Fig. 1.

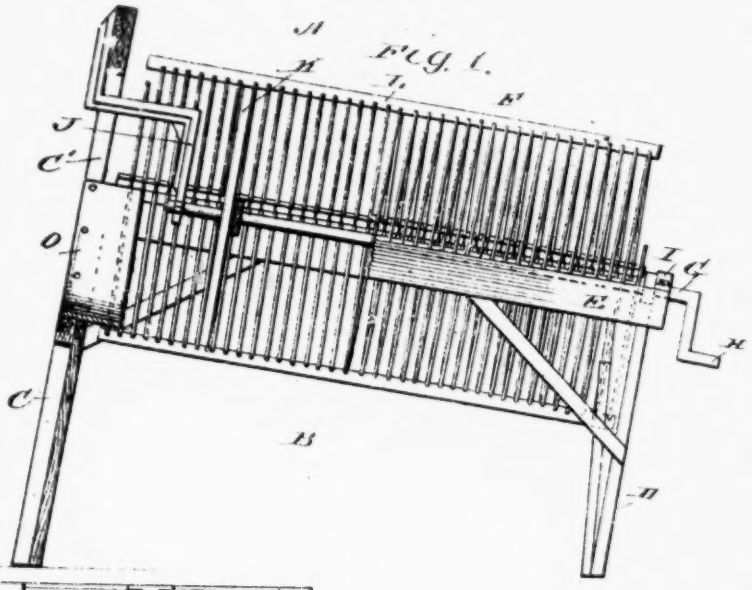


Fig. 2.

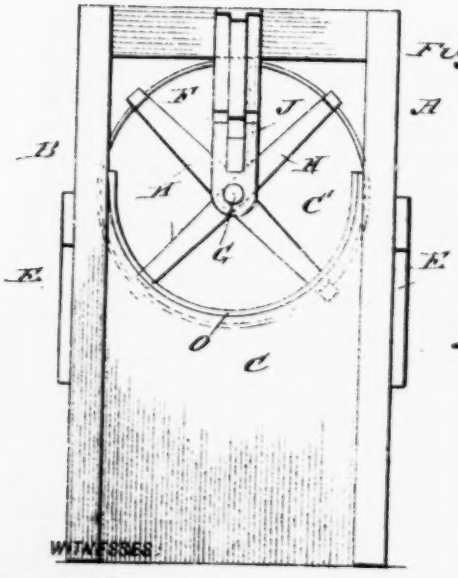
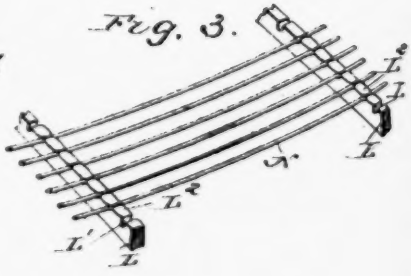


Fig. 3.



WITNESSES:

W. R. Davis.

E. M. Clark

INVENTOR:

C. Prescott

M. H. Bennett

BY Munn & Co.

ATTORNEYS

UNITED STATES PATENT OFFICE.

CHARLES PRESCOTT AND MOSES H. BENNETT, OF FAIRMOUNT, NEBRASKA.

SAND-SCREEN.

SPECIFICATION forming part of Letters Patent No. 447,162, dated February 24, 1891.

Application filed June 30, 1890. Serial No. 357,269. (No model.)

To all whom it may concern:

Be it known that we, CHARLES PRESCOTT and MOSES H. BENNETT, of Fairmount, in the county of Fillmore and State of Nebraska, have invented a new and Improved Sand-Screen, of which the following is a full, clear, and exact description.

The object of the invention is to provide a new and improved sand-screen which is simple and durable in construction, very effective in operation, and quickly separates the fine sand from the coarser materials, such as gravel, &c.

The invention consists in certain parts and details and combinations of the same, as will be described hereinafter, and then pointed out in the claim.

Reference is to be had to the accompanying drawings, forming a part of this specification, in which similar letters of reference indicate corresponding parts in all the figures.

Figure 1 is a side elevation of the improvement with parts in section. Fig. 2 is an upper end view of the improvement; and Fig. 3 is a perspective view of part of the screen, showing the fastening of the coiled wire to the longitudinal bars.

The improved sand-screen A is provided with a suitable frame B, having an inclined head C and a foot D, said head and foot being connected with each other by suitable beams E. In the frame B is arranged a screen F, having a longitudinal and slightly-inclined shaft G, carrying at its lower end a crank-arm H for conveniently turning the shaft and its screen. The shaft is mounted near its lower end in a bearing I secured on the foot D, and the upper end of the said shaft is journaled in a bracket J, secured to the head C and projecting through the opening C′ in the latter a suitable distance into the screen F, as is plainly shown in Fig. 1. The bracket J is arranged in this form so as to present no obstruction when introducing material through the opening C′ into the upper end of the screen F.

On the shaft G are secured sets of spokes K, which support at their outer ends longitudinally-extending bars L, each provided with recesses L′ formed on their inner sides and adapted to receive the coils of a wire N forming the meshes of the screen. The wire N is coiled in cylindrical form and is passed into the several recesses L′ of the longitudinal bars L, after which the part L′ extending between two successive recesses L′ is hammered so as to cover the coil, thereby holding the latter in place on the longitudinal bars. The coil of wire N extends throughout the length of the bars L and the coils are placed suitable distances apart, according to the material under treatment.

In the bottom of the opening C′ is secured a semicircular plate O, which extends into the upper end of the screen F, so that the material passed over the said plate O is guided onto the upper end of the screen. As the latter is placed in an inclined position, the material readily passes from the upper end of the screen toward its lower end when the shaft G is turned, and the material is constantly agitated by the revolution of the screen, so that the fine sand falls through the meshes formed by the coils of the wire N between the head C and the foot D, while the coarser material travels along the screen to the lower end and drops out of the latter at the outside of the foot D.

It will be seen that a screen formed in this manner is very simple and durable in construction, can be cheaply manufactured, and is not liable to get out of order. The bars L are preferably of a soft metal, so as to permit easy riveting of the parts L² to lock the coils of the wire N in place.

The bars L may be placed inside the coil of wire N, and in this case the recesses L′ are formed on the outer side or top of the bars.

Having thus described our invention, we claim as new, and desire to secure by Letters Patent—

The herein-described screen, comprising the frame B, having a circular opening C′ in its front, a double angle-bracket J, secured to the front of the frame, projecting through the said opening, and having a shaft-bearing in the lower end of its inner depending arm, a bearing I at the opposite end of the frame, a rotary sieve having a central shaft G mounted in the said bearings, the bracket J, projecting into the interior of the screen, as shown, and the curved plate O, projecting inwardly from the bottom of the opening C′, substantially as set forth.

CHARLES PRESCOTT.
MOSES H. BENNETT.

Witnesses:
CLARK ROBINSEN,
J. E. CURTISS.

(No Model.)

J. NORWOOD.

SCREEN FOR SAND, &c.

No. 571,575. Patented Nov. 17, 1896.

Fig. 3.

Fig. 4.

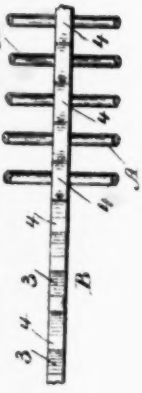


Fig. 2.

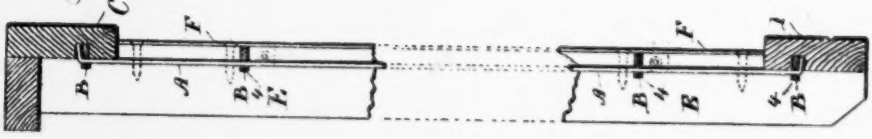
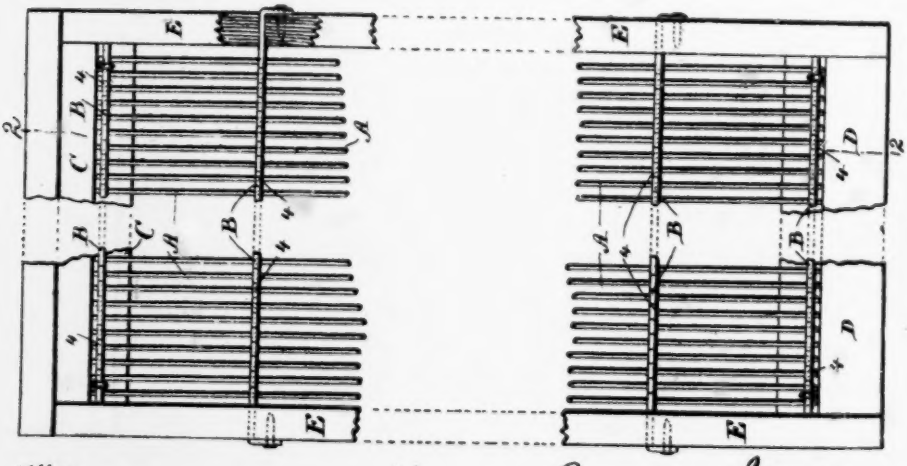


Fig. 1.



Witnesses
Chas. H. Smith
J. Stail.

Inventor
Joseph Norwood
by L. W. Serrell & Son
Attys

UNITED STATES PATENT OFFICE.

JOSEPH NORWOOD, OF BROOKLYN, NEW YORK

SCREEN FOR SAND, &c.

SPECIFICATION forming part of Letters Patent No. 571,575, dated November 17, 1896.

Application filed March 11, 1896. Serial No. 582,719. (No model.)

To all whom it may concern:

Be it known that I, JOSEPH NORWOOD, a citizen of the United States, residing at Brooklyn, in the county of Kings and State of New York, have invented an Improvement in Screens for Sand, &c., of which the following is a specification.

Screens have heretofore been made with longitudinal parallel wires and the wires have been kept at the proper distances apart by cross-lacings of wire, and in some instances the lacing-wires have also secured transverse rods. This involves considerable hand labor and the expense is correspondingly increased. In other instances the parallel wires have been let into notches in the edges of bars and the metal at the ends of the notches has been upset or riveted, so as to spread the same partially over the wires and hold them in position; but this mode of securing the wires is unreliable and requires considerable labor in spreading or upsetting the metal to secure the wires.

The object of the present invention is to simplify the construction of the screen, lessen the cost of the same, and render the connection between the wires and the cross-bars stronger and more durable.

I make use of parallel wires held together by one or more cross-bars, each cross-bar being made with diagonal incisions for the reception of the wires, and which wires are held firmly in position by bending down the hook-shaped points of the cross-bars at the acute angles between the slots and the edges of the cross-bars, thus firmly grasping and holding the parallel wires; and in constructing a sand-screen I use similar cross-bars at the top and bottom ends, the same being introduced into grooves or between transverse slats at the top and bottom ends of the screen, and the ends of the cross-bars are bent up at right angles, so as to firmly hold the side pieces of the screen-frame in their proper relative positions.

In the drawings, Figure 1 is an elevation representing the top and bottom portions of a sand-screen, one of the side pieces being in section. Fig. 2 is a longitudinal section at the line 2 2. Fig. 3 shows part of one of the cross-bars with some of the wires in position and with some of the slots open ready for the reception of the longitudinal wires, and Fig. 4 is a plan of the parts shown in Fig. 3.

The parallel bars A or wires are of any desired size, shape, and length, and the cross-bars B are applied at suitable distances apart, and each cross-bar is of the desired strength and preferably of a comparatively soft steel, and in one edge of each cross-bar slots 3 are made by the action of a suitable die and punch or by saws or cutters. Each slot is diagonal, so as to leave the metal at one side of the slot in the form of an acute angle, and the slots are sufficiently deep for the acute angles to form hooks 4, and the wires are introduced into the slots and resting at the bottoms of the slots the hooks 4 are pressed down or bent over the wires, so as to retain them in position in a very firm and reliable manner, and by making the slots in the form represented in Fig. 3 the acute-angle hooks 4 can be bent down rapidly by a roller or other tool forcibly brought into contact with the edge of the bar and passed across the same.

It is advantageous to bend the ends of the wires A at right angles, so as to come outside the top and bottom cross-bars of the screen and thus prevent end motion to such wires.

Screens made in this manner can be made up into any desired form, and where they are employed with a wooden frame, as shown in the drawings, for use in screening sand, ashes, or other materials, the top and bottom cross-bars and the bent ends of the wires A are received into grooves in the top and bottom cross-pieces C and D, which connect the side pieces E at the upper and lower portions of the screen, or these top and bottom cross-bars B may be received between two of the slats or cross-pieces forming the top and bottom ends of the screen.

The intermediate cross-pieces B on the screen are made sufficiently long for their ends to project beyond the side pieces E, and such cross-pieces are received into notches or saw-cuts in the back edges of such side pieces E, and they are bent outwardly and at right angles and preferably secured by screws or nails passing through the perforated ends of the cross-bars, so as to connect the side pieces E firmly to the cross-bars, and I usually employ bands F, nailed or screwed to the back edges of the side pieces E, as an ad-

ditional support for holding the cross-bars B in their proper positions.

I claim as my invention—

1. The combination in a screen with the top and bottom cross-pieces having grooves in their surfaces, of longitudinal parallel wires having their ends bent at right angles, cross-bars each having diagonal slots forming acute-angle hooks, the slots receiving the wires and the hooks bent down to hold such wires in place, the intermediate cross-bars being secured at their ends to the side members of the frame and the cross-bars at the respective ends of the parallel wires being received with the bent ends of such wires into the grooves of the top and bottom cross-pieces of the frame, substantially as set forth.

2. The combination in a screen with the parallel wires, of cross-bars slotted diagonally and receiving the wires, the acute-angled hooks of the cross-bars being bent down to hold the wires in position and the ends of the cross-bars being bent at right angles, the cross-pieces C D and the side frames connected together, such side frames being notched for the passage of the end portions of the cross-bars, and to which side pieces the ends of the cross-bars are connected, substantially as set forth.

Signed by me this 9th day of March, 1896.

JOSEPH NORWOOD.

Witnesses:

GEO. T. PINCKNEY,

MARY L. BYRNE.

(No Model.)

R. V. CLARK.

FENCE STAY.

No. 589,593. Patented Sept. 7, 1897.

Fig. 1.

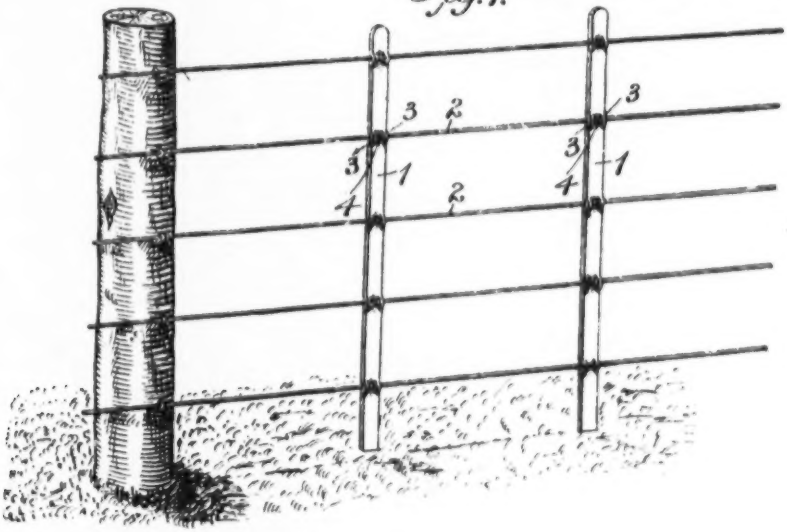


Fig. 2.

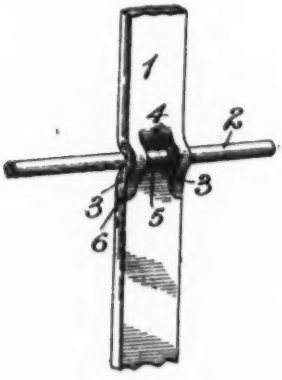


Fig. 3.

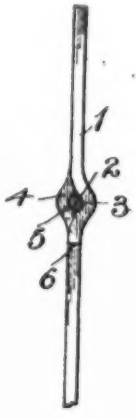
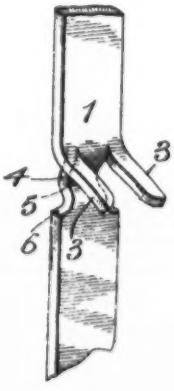


Fig. 4.



Witnesses
Edwin G. McKee
O. E. Doyle

Inventor
Robert V. Clark.

By his Attorneys,
Cashow & Co.

UNITED STATES PATENT OFFICE.

ROBERT V. CLARK, OF TIFFIN, OHIO.

FENCE-STAY.

SPECIFICATION forming part of Letters Patent No. 589,593, dated September 7, 1897.

Application filed May 15, 1897. Serial No. 636,656. (No model.)

To all whom it may concern:

Be it known that I, ROBERT V. CLARK, a citizen of the United States, residing at Tiffin, in the county of Seneca and State of Ohio, have invented a new and useful Fence-Stay, of which the following is a specification.

My invention relates to fences, and particularly to stays for use in connection with wire fences to engage and secure the runners in the desired relative positions; and the object in view is to provide a simple and efficient construction of lock or runner-engaging device whereby the parts are securely held against independent relative movement and whereby in case of necessity the runner may be disconnected to provide for replacing or splicing a broken runner.

Further objects and advantages of this invention will appear in the following description, and the novel features thereof will be particularly pointed out in the appended claim.

In the drawings, Figure 1 is a view of a fence having its runners connected by means of stays constructed in accordance with my invention. Fig. 2 is a detail view in perspective of a portion of a stay with a lock thereof engaged with a runner. Fig. 3 is an edge view of the same. Fig. 4 is a detail view in perspective of a portion of a stay with the tongues of the lock deflected, as seen before applying the same to a runner.

Similar numerals of reference indicate corresponding parts in all the figures of the drawings.

1 designates a stay provided at intervals with locks for engagement with runners 2, the intervals between the locks corresponding with the desired intervals between the runners. Each lock is formed by providing longitudinal cuts or slits in the stay contiguous to and parallel with the side edges thereof, and thereby providing tongues 3, which are free at their lower extremities, in order to engage over a runner, said tongues being integral with the stay; also, the reduced portion 4 of the stay between the upstruck tongues is crimped to form a transverse seat 5 for the reception of the runner, while the tongues are crimped in the opposite direction by the operation of folding them toward the plane of the stay after the introduction of the runner, whereby the distance between the point of junction of each tongue with the body portion of the stay and the lower end of the recess from which the tongue has been struck is equal to the length of the tongue. Hence when the tongue is folded rearwardly until its extremity is in the plane of the body portion of the stay said extremity is also approximately in contact with the lower end of the recess from which it was struck. The shoulder 6 at the lower end of the recess thus forms a guard, approximately in contact with which the extremity of the tongue is arranged, whereby passing objects are prevented from being caught by the extremities of the tongues, and yet a forward pressure upon the lower extremities of the tongues, applied from the rear of the stay, will be sufficient to displace the free ends of the tongues, and thereby enable a stay to be disconnected.

From the above description it will be seen that the essential feature of the invention resides in the fact that the tongues are formed at opposite side edges of the stay by means of cuts or slits formed approximately parallel with said side edges, said tongues and the intermediate reduced or neck portion of the stay between said tongues being crimped, respectively, in opposite directions and to the same extent, whereby the shortening of the tongues is equal to the shortening of the neck portion, and hence of the recesses from which the tongues were struck, and therefore when the tongues are folded to bring their extremities into the plane of the stay they are approximately in contact with the shoulders at the lower extremities of the recesses, and are thereby protected.

Various changes in the form, proportion, and the minor details of construction may be resorted to without departing from the spirit or sacrificing any of the advantages of this invention.

Having described my invention, what I claim is—

The herein-described cross-sectionally flat metallic fence-stay for connecting runners, the same being provided at intervals with runner-locks, each consisting of parallel lateral tongues 3 upstruck from the body of the

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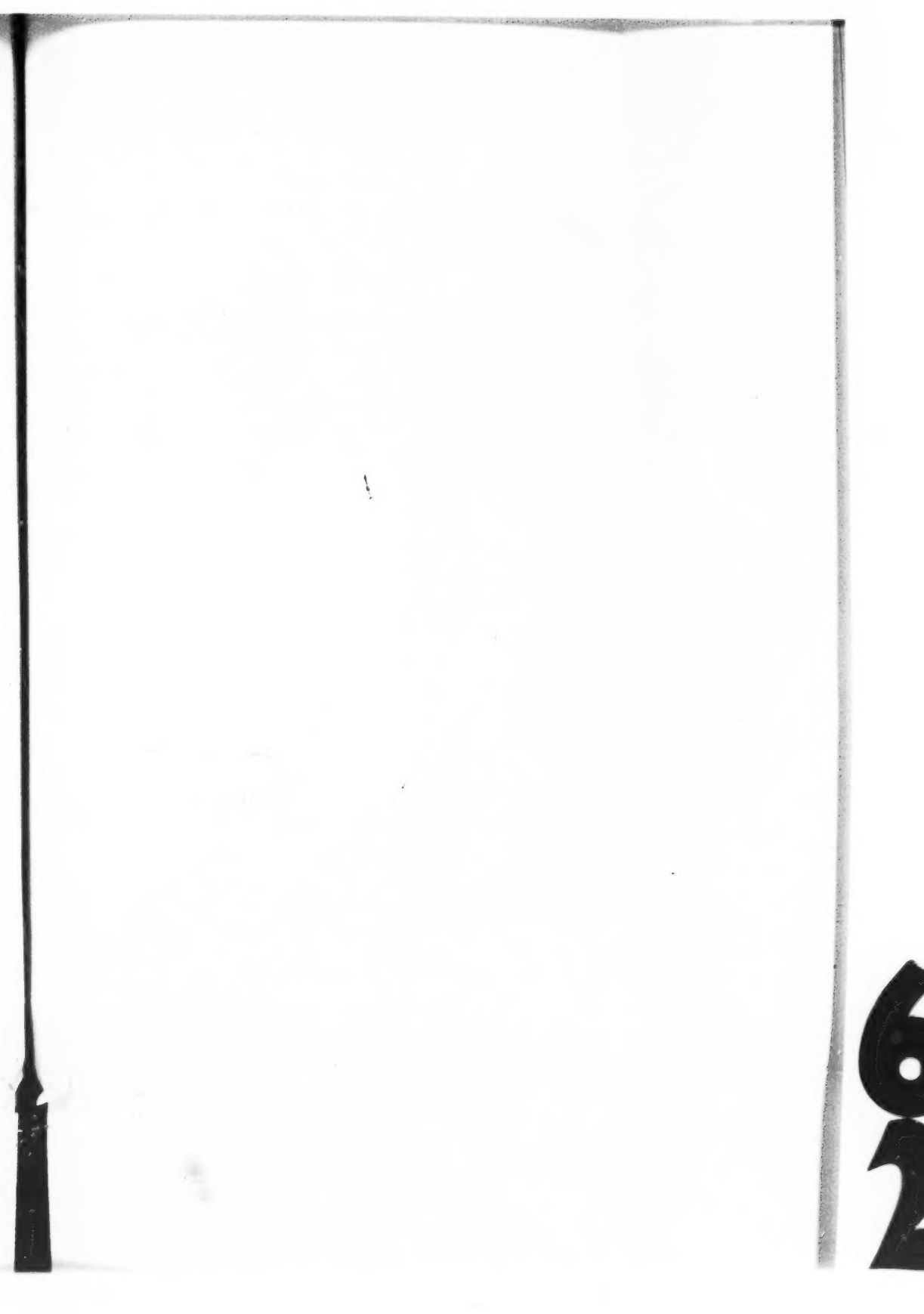
stay at its edges, to form side recesses and an intermediate reduced or neck portion, and said tongues and reduced or neck portion being crimped or bowed respectively in opposite directions to equal extents to receive a runner therebetween, and the extremities of the tongues being pressed rearwardly into the plane of the body portion of the stay to fill the lower ends of the recesses and lie in contact with the shoulders at the lower extremities thereof, substantially as specified.

In testimony that I claim the foregoing as my own I have hereto affixed my signature in the presence of two witnesses.

ROBERT V. CLARK.

Witnesses:
H. J. WELLER,
JNO. B. SCHWARZ.



No. 723,657. PATENTED MAR. 24, 1903.

S. L. EASON.

FENCE POST.

APPLICATION FILED SEPT. 12, 1902.

NO MODEL.

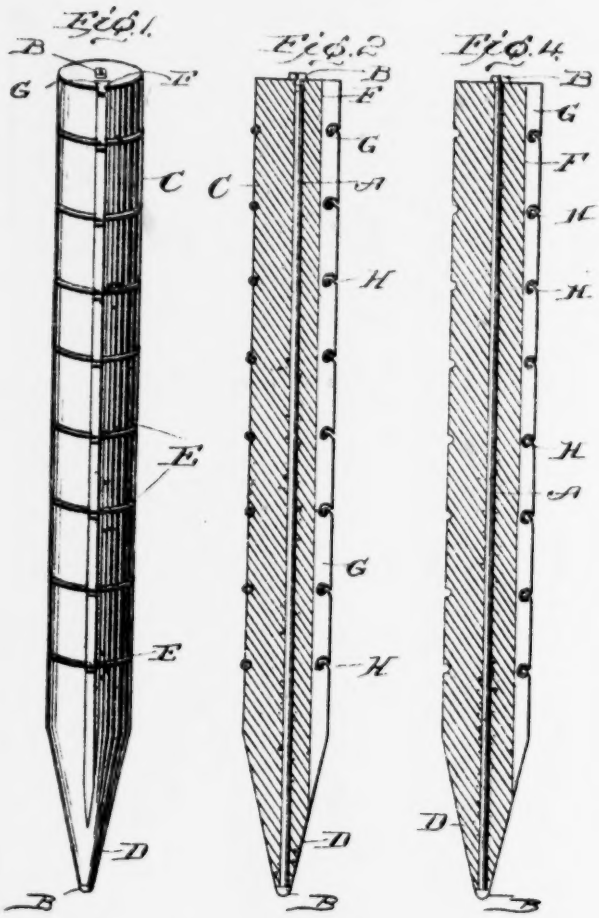
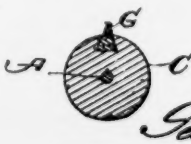


Fig. 3



Witnesses
J. M. Fowler Jr
May E. Moore

Samuel L. Eason, Inventor

By Wm. V. Moore Attorney

UNITED STATES PATENT OFFICE.

SAMUEL L. EASON, OF SCRANTON, IOWA, ASSIGNOR OF ONE-HALF TO SILAS G. KIONS, OF SCRANTON, IOWA.

FENCE-POST.

SPECIFICATION forming part of Letters Patent No. 723,657, dated March 24, 1903.

Application filed September 12, 1902. Serial No. 123,083. (No model.)

To all whom it may concern.

Be it known that I, SAMUEL L. EASON, a citizen of the United States, residing at Scranton, in the county of Greene and State of Iowa, have invented certain new and useful Improvements in Fence-Posts, of which the following is a specification.

My invention relates to improvements in fence-posts; and the object of my invention is the production of a fence-post which will be indestructible, attractive in appearance, thoroughly efficient, and inexpensive of production, thus insuring a practical fence-post.

With this object in view my invention consists of a fence-post embodying novel features of construction and combination of parts, substantially as disclosed herein.

Figure 1 represents a perspective view of my fence-post. Fig. 2 represents a vertical sectional view with the wires shown in the strip and post. Fig. 3 represents a horizontal sectional view, and Fig. 4 represents a vertical sectional view.

A designates a vertical rod which forms the core or center of my fence-post, said bar having threaded ends to receive nuts B, which serve to sustain the body C of the fence-post, said body being of cylindrical shape with the lower tapering end D to facilitate insertion or driving of the post into the ground. The body of the post is preferably made of cement and is formed with a series of grooves or depressions E, the purpose of which is to receive wires for binding the horizontal line-wires of the fence, and the body is formed on one side with an angular vertical channel F, which receives the strip G, which may be made of wood and to which the horizontal line-wires are secured by means of staples, as will be apparent, or the vertical strip may be made of metal and formed with a series of kerfs or seats H, which receive and hold the line-wires in place.

From the foregoing description and drawings it is evident that I provide a fence-post which is inexpensive of production and very durable and which is thoroughly efficient and practical.

I claim—

The fence-post herein shown and described, consisting of the central rod or core having a nut on its upper end and a tapering head on its lower end to enable the post to be easily driven, a plastic body surrounding the rod and having a vertical channel in one side, a series of parallel transverse grooves around the body and a tapering lower end and a strip fitting in the channel of the body having kerfs to receive the line-wires.

In testimony whereof I affix my signature in presence of two witnesses.

SAMUEL L. EASON.

Witnesses:
ALLEN GLENN,
P. P. PITCHER.

No. 752,523. PATENTED FEB. 16, 1904.

A. G. CONSIDERE.

ARMED OR STIFFENED CONCRETE CONSTRUCTION.

APPLICATION FILED JUNE 27, 1902.

NO MODEL.

Fig. 1.

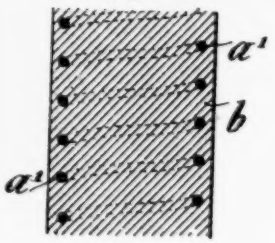


Fig. 3.

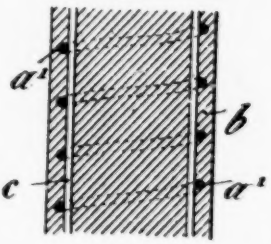


Fig. 2.

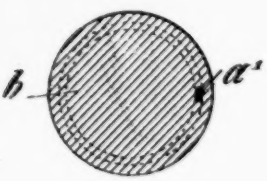


Fig. 4.

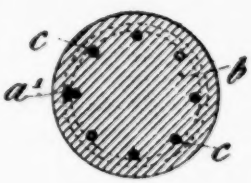


Fig. 5.

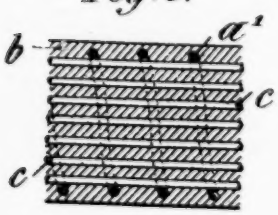


Fig. 6.

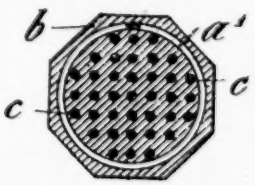
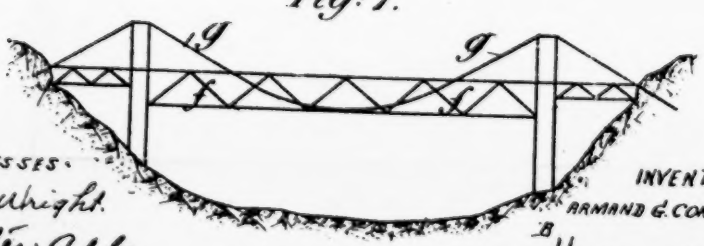


Fig. 7.



WITNESSES.
P. W. Wright.
Waller Abbe

INVENTOR
ARMAND G. CONSIDERE
By Howson and Howson
HIS ATTORNEYS.

No. 752,523. Patented February 16, 1904

UNITED STATES PATENT OFFICE.

ARMAND GABRIEL CONSIDERE, OF PARIS, FRANCE

ARMED OR STIFFENED CONCRETE CONSTRUCTION.

SPECIFICATION forming part of Letters Patent No. 752,523, dated February 16, 1904.

Application filed June 27, 1902. Serial No. 113,467. (No model.)

To all whom it may concern:

Be it known that I, ARMAND GABRIEL CONSIDERE, a citizen of the Republic of France, residing in Paris, France, have invented certain new and useful Improvements in Armed or Stiffened Concrete Constructions, of which the following is a specification.

This invention has for its object to produce concrete or cement columns or the like structures which in service are adapted to withstand great compression or tension strains in a longitudinal direction. This object is secured by embedding strengthening-wires in helicoidal coils around a solid concrete core and covering the coils to protect them from the atmosphere.

In the accompanying drawings, Figure 1 is a longitudinal section of part of a column constructed to sustain longitudinal pressure. Fig. 2 is a cross-section of the same. Fig. 3 is a view similar to Fig. 1 of a modification with longitudinal strengthening-rods. Fig. 4 is a cross-section of the same. Fig. 5 is a longitudinal section, and Fig. 6 is a cross-section of a column with a greater number of longitudinal rods and which is to sustain longitudinal tension. Fig. 7 is a side view showing a means for tensioning the longitudinal rods before applying the concrete.

As shown in Figs. 1, 3, and 5, a helicoidal coil of metal *a'* is embedded in a solid core *b* of concrete or cement, so as to embrace the greater part of the solid core, but sufficiently below the surface to be protected from the atmosphere by the outer covering.

In Figs. 3, 4, 5, and 6 besides the helicoidal coils the core is provided with a number of longitudinal metal rods *c*. The object of thus encircling the solid core with the helicoidal coils *a'* of metal is to overcome the tendency of the concrete column when placed under compression strain longitudinally from breaking by lateral expansion of the column later. These helicoidal coils thus greatly increase the strength of a concrete column. It also has been found that when such column has been collapsed by excessive pressure under test warning is given for quite a time before rupture.

Tensional strains in my improved columns or cables are met by providing within the coils *a'* many longitudinal rods *c*, as shown particularly in Figs. 5 and 6.

In Fig. 7 I have represented a practical construction for carrying into effect a method of giving a preliminary tension to the longitudinal wires *c*. They are suspended like an ordinary cable, and I hang a foot-bridge or other temporary structure on them to cause them to take up the curve or other shape that the resulting bridge may require, and I then apply the helicoidal coils and concrete to these cables. By this means rupture of the concrete when the finished tension members are put under tension in use will be avoided.

I am aware that it has previously been proposed to embed in concrete pipes rings of metal; but these structures are hollow and for that reason are not adapted to stand compression or tension strains in a longitudinal direction to which my solid columns or cables are to be subjected.

I am aware of British Patents No. 1,715 of 1874 and No. 14,559 of 1885, showing skeletons of iron made with spiral coils riveted to each other or to longitudinal rods to carry concrete; but in my beams the concrete forms the essential basis of the column and my coils are independent—that is, not connected to the other coils or to longitudinal rods in the concrete.

I claim as my invention—

1. A column or the like of concrete, comprising a solid concrete core with independent helicoidal coils of metal surrounding said core, and arranged very close together, substantially as described.

2. A column or the like of concrete, comprising a solid concrete core with independent helicoidal coils of metal surrounding said core, and arranged very close together, and a covering for the coils, substantially as described.

3. A column or the like of concrete, comprising a solid concrete core, longitudinal rods within the core and independent helicoidal coils of metal arranged very close together and surrounding the core and rods, substantially as described.

4. A column or the like of concrete, comprising a solid concrete core, longitudinal rods

within the core and independent helicoidal coils of metal arranged very close together and surrounding the core and rods, and a covering for the coils, substantially as described.

5. A concrete construction, comprising longitudinal metal rods tensioned in the shape they are to maintain, and a concrete covering for said rods to make a solid core, and independent helicoidal coils arranged very close together, surrounded and retaining the core, substantially as described.

In testimony whereof I have signed my name to this specification in the presence of two subscribing witnesses.

ARMAND GABRIEL CONSIDERE.

Witnesses:

LÉON FRANCKEN,

EDWARD P. MACLEAN.

No. 756,471. PATENTED APR. 5, 1904.

J. D. CAREY.

CONSTRUCTION OF JOISTS, GIRDERS, OR THE LIKE.

APPLICATION FILED NOV. 11, 1903.

NO MODEL.

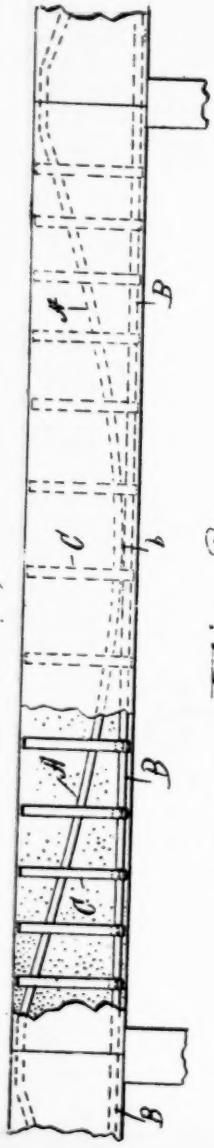


Fig. 1.

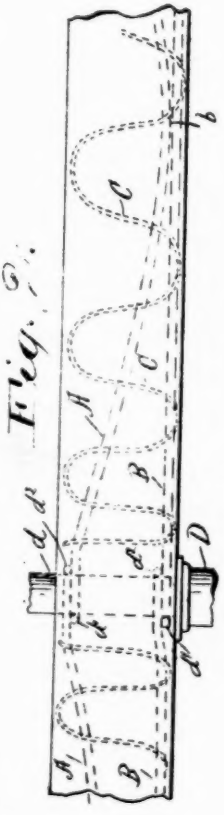


Fig. 2.

Fig. 3.

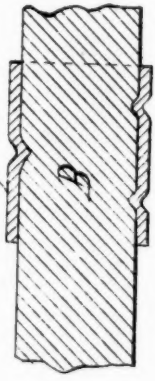


Fig. 4.

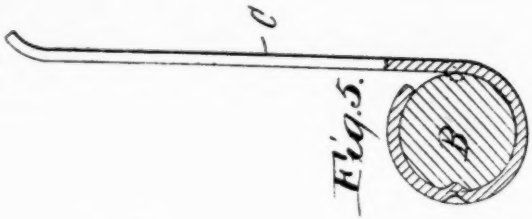


Fig. 5.

Witnesses.
E. B. Gilchrist
E. B. Donnelly

Inventor.
James D. Carey
by
W. E. Donnelly
his Atty

No. 756,471. Patented April 5, 1904.

UNITED STATES PATENT OFFICE.

JAMES D. CAREY, OF CLEVELAND, OHIO.

CONSTRUCTION OF JOISTS, GIRDERS, OR THE LIKE.

SPECIFICATION forming part of Letters Patent No. 756,471, dated April 5, 1904.

Application filed November 11, 1903. Serial No. 180,721. (No model.)

To all whom it may concern:

Be it known that I, JAMES D. CAREY, a citizen of the United States, residing at Cleveland, in the county of Cuyahoga and State of Ohio, have invented certain new and useful Improvements in Construction of Joists, Girders, or the Like; and I do hereby declare the following to be a full, clear, and exact description of the invention, such as will enable others skilled in the art to which it pertains to make and use the same.

This invention relates to building construction wherein beton or cement form the base of the structure, the same being interwoven with metallic struts, braces, tie-rods, or strengthening elements arranged in predetermined order.

The objects of the invention are to attain the best results by the peculiar formation of what are called the "suspension-rods" and in connection with this a peculiar arrangement of stirrup-pieces or tie-pieces arranged vertically and extending from the chords into the body of the cement and in juxtaposition to the brace-rods.

Still another object of this invention is to adapt the structure to the use of the same in connection with supporting-pillars, whereby both the chords and the suspension-rods are caused to embrace the upper end of the pillars, bringing the strain upon the same in opposite directions.

Other objects of this invention will appear and be apparent in the drawings and specification.

This invention consists in the peculiar arrangement and structural features as a whole and which will be hereinafter fully set forth and claimed.

In the drawings, Figure 1 illustrates a joist or girder constructed of beton and illustrating the arrangement of suspension and chord rod and stirrup-pieces. Fig. 2 illustrates in side elevation the joist or girder construction employed in connection with a supporting-pillar, illustrating the upper end of said pillar extending through the joist or girder to receive the lower end of a pillar to be supported above it. This figure illustrates in modified construction a tie or lateral supporting element composed of spirally-arranged heavy wires and also illustrates the manner in which the suspension-rods and chords embrace the upper end of the pillar. Fig. 3 is a plan view of a portion of Fig. 2, more clearly showing the manner in which the suspension-rods and chords surround the upper end of the pillar. Figs. 4 and 5 represent in section, longitudinal and cross, the manner of securing the stirrup-pieces to the chord-rods.

The manner of forming the girders or joists is the usual process employed in beton structures, and it is with the arrangement of the metallic element and their structural features that this invention refers. These are composed of suspension-rods A, which extend from wall to wall, pier to pier, or pillar to pillar, the same in cases where pillars are not used extending a short distance beyond the supporting parts and into the next structure, as is usual. However, in structures of this type heretofore made these suspension-rods have been so arranged and bent as that they run for a considerable distance parallel to or with the chord-rods B, and hence they were abruptly bent, forming sharp turns which strain the metal at these turning-points, decreasing its tensile value and also its value in resisting flexion, and this defect was located just at the portion needing the greatest strength of resistance.

In arranging my suspension-rods 1 gradually incline them toward the point central longitudinally of the beam, and preferably in a curved direction and causing them to meet the chord-rod B at the longitudinal center *b* of the joist, girder, or structure. Usually two of the suspension-rods are employed; but more may be used, if desired or found necessary, and the cross-section of the same is predetermined according to the necessary strength desired.

Another very essential feature of my construction, as illustrated in Figs. 4 and 5, is the construction of the stirrup-pieces and their attachment to the stirrup-rod. Heretofore these stirrup-pieces C have been loosely connected to the chord-rods and in some cases have been formed U-shaped, the chord-rod lying on the bottom of the stirrup and not always in close contact therewith, and thus

for instance, should the chord-rod be bent at any particular portion the stirrup-pieces would not come up to it, and when the cement was packed in the structure the cement would work between the under part of the chord-rod and the seat of the stirrup, and thus the stirrup would not support the chord-rod, and hence would detract from its value. Those familiar with structures of this nature will fully appreciate this objection where loosely-arranged stirrups are employed.

By my arrangement as illustrated in Figs. 4 and 5 the stirrup-pieces are located on the chord-rod and are pressed thereto and caused to positively engage the same at the lower end. Thus the disposing of the stirrups is predetermined positive and not left to or liable to be disarranged by the unskilled laborer employed in filling or tamping the beton.

As illustrated in Figs. 2 and 3 of the drawings, instead of using stirrup-pieces a continuous rod arranged so as to brace the chord-rods and the suspension-pieces may be employed. These figures also illustrate the manner in which the structure may be employed in connection with pillars D. In this case the suspension-rods A and chords B are caused to embrace the upper end of the column or pillar D at its impost portion, thus bringing the strain in both directions and in opposite directions, as at d' d^2, when the pillars are employed and allowing the pillar to pass through the structure to receive a superimposed pillar.

By disposing the metal as above described I attain great strength of structure, economy and positiveness in arrangement of the metallic element, and convenience in assembling the structure as a whole, as it will be seen that the elements of metal may be prearranged with their coacting parts previous to locating them and filling in the cement or beton.

In setting forth this invention I have called attention to particular arrangements and structural features of element, but do not wish to be limited to the same as they are described or set forth.

What I claim is—

1. In a combined cement and metallic structure, the combination with a chord member of a suspension member bent downwardly from each supporting portion of the structure to a point longitudinally central of the chord member meeting the chord member at said point, and vertically-disposed stirrup members supporting the chord member, and means integral with the said members adapted to positively engage the chord member to hold the stirrup members in fixed position, substantially as described.

2. In a combined beton and metallic structure, the combination with a chord member, of a curved suspension member which meets the first-named member at a point longitudinally central thereof, stirrup members secured to and supporting the chord member, and means formed integral with the stirrup members adapted to positively engage the chord member so as to retain said stirrup members in position.

3. In a combined cement and metallic structure, a chord member, a stirrup member supporting the same at one side thereof, and means formed integral with the stirrup member adapted to positively engage the chord member and retain the stirrup member in position, substantially as set forth.

4. In structures comprising combined cement and metal, the combination with a chord member, of a suspension member bent downwardly and meeting the chord member at a point longitudinally central thereof, a stirrup member supporting the chord member, and means formed integral with the stirrup member to retain the stirrup member in position, substantially as described.

Signed at Cleveland, in the county of Cuyahoga and State of Ohio, this 14th day of February, 1903.

JAMES D. CAREY.

Witnesses:
E. B. DONNELLY,
W. E. DONNELLY.

No. 766,899.

PATENTED AUG. 9, 1904.

F. POHLMANN.

CONCRETE OR LIKE GIRDER.

APPLICATION FILED JUNE 6, 1903.

NO MODEL.

Fig. 1.

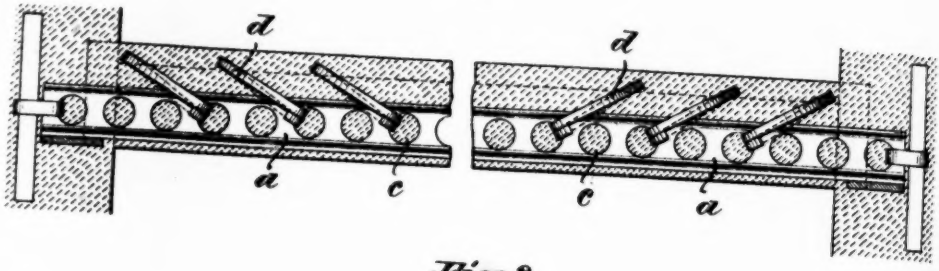


Fig. 2.

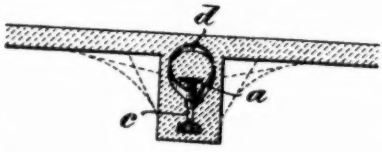


Fig. 3.

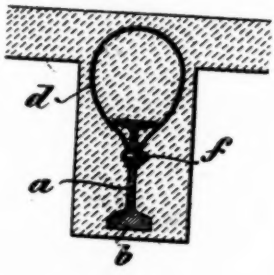


Fig. 4.

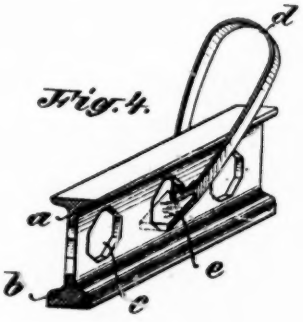


Fig. 5.

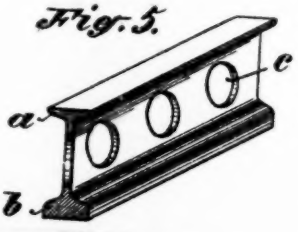
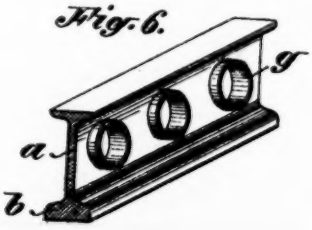


Fig. 6.



Witnesses:

Ewell A. Dick

N. H. Robbins

Inventor:

Fritz Pohlmann

by Marcellus Bailey

Atty

No. 766,899. Patented August 9, 1904.

UNITED STATES PATENT OFFICE.

FRITZ POHLMANN, OF SCHÖNEBERG-BERLIN, GERMANY.

CONCRETE OR LIKE GIRDER.

SPECIFICATION forming part of Letters Patent No. 766,899, dated August 9, 1904.

Application filed June 6, 1903. Serial No. 160,379. (No model.)

To all whom it may concern:

Be it known that I, FRITZ POHLMANN, a subject of the King of Prussia, residing at No. 37 Hohenstaufenstrasse, Schöneberg-Berlin, Kingdom of Prussia, German Empire, have invented new and useful Improvements in Concrete or Similar Girders, of which the following is a specification.

This invention relates to a new construction of concrete girder by means of which a considerable saving in iron can be effected by statically utilizing the filling material forming the connection between the ceilings and the girder.

In the accompanying drawings, Figure 1 is a longitudinal section, partly in elevation, of a concrete girder constructed in accordance with this invention. Fig. 2 is a transverse section of the same. Fig. 3 is a sectional view of the iron girder and loop. Fig. 4 is a similar view of a perforated iron girder and loop. Fig. 5 is a perspective view of the perforated iron girder. Fig. 6 is a perspective view of the iron girder with flanged holes.

Like letters indicate like parts throughout the drawings.

The upper iron flange and the upper half of an ordinary I-girder *a* is partly replaced by concrete material. A similar construction is known in armored concrete girders, where the lower flange of the girder is replaced by bar (round or square) iron surrounded by concrete; but in that case there is the drawback that the iron armor in itself before the stone or concrete material has been added has little or no stability. This drawback is obviated in the present invention by using strong rolled-iron beams *b* for the part exposed to tensile stress. Its bending strength is calculated to be sufficient for supporting the weight of the wooden binding-joists required for making the ceiling and the weight of the stone or concrete itself. In this way there is no necessity for supporting the binding-joists by scaffolding, and said binding-joists can be attached direct to the iron part in the same way as for ordinary girders, besides which the ceilings need not be made until after the roof has been completed, as the iron part of the girder sufficiently strengthens the walls. In order to make the iron part of suitable shape for its action in the stone, the mass of metal is concentrated at the part *b* subjected to the greatest stress. The cross-section is therefore unsymmetrical relatively to the horizontal axis, and the tensile stress produced in the concrete girder is taken up by the lower thickened flange *b* of the iron girder. The sheering stress acting on the concrete girder is taken up by connecting the iron part with the stone or concrete material in the best possible way. This connection is effected partly by the adhesion of iron and concrete and partly by mechanical means.

The iron part is provided throughout the whole of its length with holes *c*, arranged at small intervals and of such height as to occupy nearly the whole height of the web. When embedded in the concrete, the filled holes transmit the sheering stress produced by the tensile strains on the perforations of the iron, acting as stone rivets. In order to obtain a greater bearing-surface in the perforated girders, the holes can be provided with flanges *g*, Fig. 6.

For increasing the resistance against tensile stress metal bands or loops *d* may be attached near the ends of the iron girders by screws *f*, rivets, or the like, or they may be passed through the holes *c*, Figs. 1, 3, and 4, and secured in their position by wedges or stays *e*, Fig. 4.

What I claim as my invention, and desire to secure by Letters Patent of the United States, is—

1. In a concrete girder the combination with the concrete material, of a metal beam having an upper flange and a lower flange of greater thickness than the upper flange and a web provided with perforations extending from near the lower flange to near the upper flange.

2. In a concrete girder the combination with the concrete material, of a metal beam having an upper flange and a lower flange of greater thickness than the upper flange and a web provided with flanged perforations extending from near the lower flange to near the upper flange.

3. In a concrete or similar girder in combination with the concrete material of a metal

beam having a lower thickened flange and web with metal bands or loops attached thereto, substantially as and for the purpose stated.

4. In a concrete or similar girder the combination, of the concrete material with a metal beam having a lower thickened flange, web provided with holes, and metal bands or loops secured in said holes, substantially as and for the purpose stated.

5. In a concrete or similar girder the combination, of the concrete material with a metal beam having a lower thickened flange, web provided with holes, and metal bands or loops passed through the holes and secured in their position by wedges or stays, substantially as and for the purpose stated.

In testimony whereof I have hereunto set my hand in presence of two subscribing witnesses.

FRITZ POHLMANN.

Witnesses:
WOLDEMAR HAUPT,
HENRY HASPER.

No. 768,284. PATENTED AUG. 23, 1904.

J. KAHN.

COMBINED STEEL AND CONCRETE BEAM.

APPLICATION FILED JAN. 20, 1904.

NO MODEL. 2 SHEETS—SHEET 1.

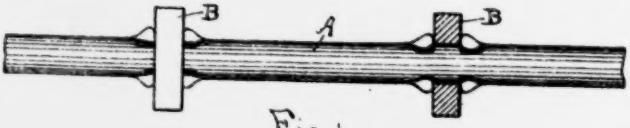


Fig. 1.

Fig. 8.

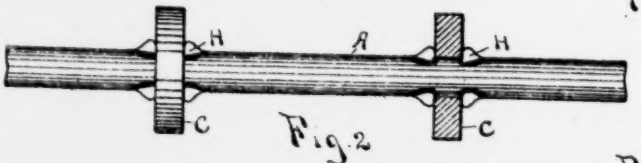


Fig. 2.

Fig. 9.

Fig. 3.

Fig. 10.

Fig. 4.

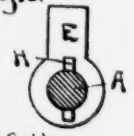


Fig. 11.

Fig. 5.

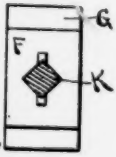


Fig. 12.

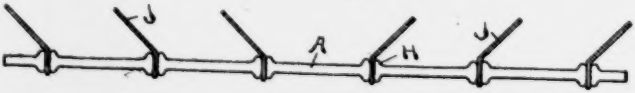


Fig. 6.

Fig. 13.

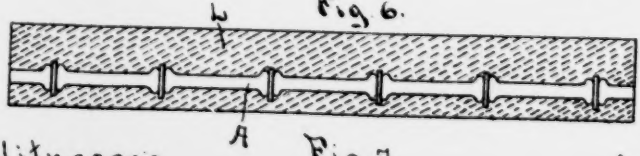


Fig. 7.

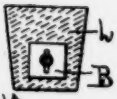


Fig. 14.

Witnesses.
Geo. W. Barnes.
A. E. Wilcox

Inventor.
Julius Kahn.
by Edward N. Pagelsen.
his Attorney.

No. 768,284. PATENTED AUG. 23, 1904.

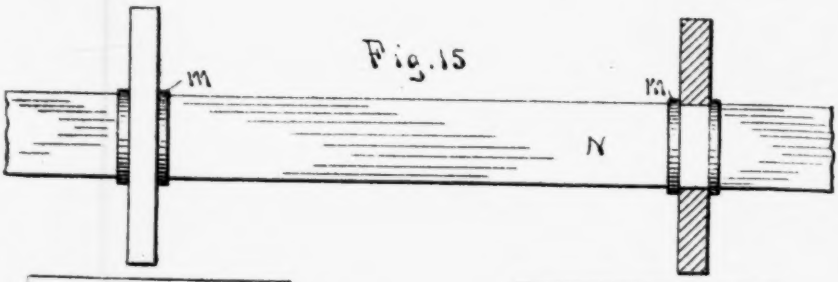
J. KAHN.

COMBINED STEEL AND CONCRETE BEAM.

APPLICATION FILED JAN. 20, 1904.

NO MODEL. 2 SHEETS—SHEET 2

Fig. 15



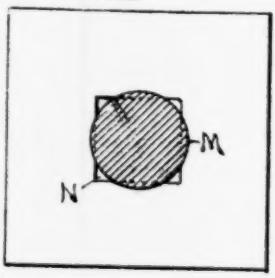


Fig. 16.

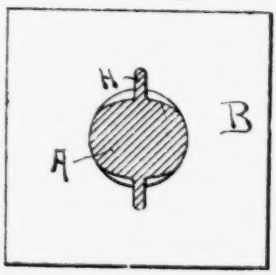


Fig. 18.

Fig. 17.

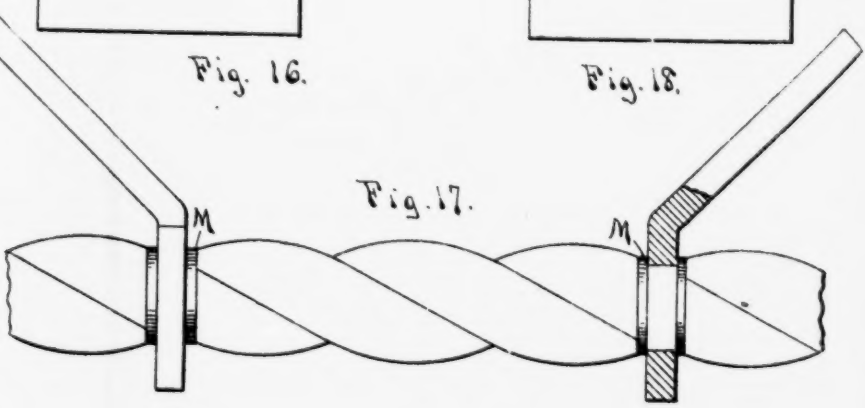
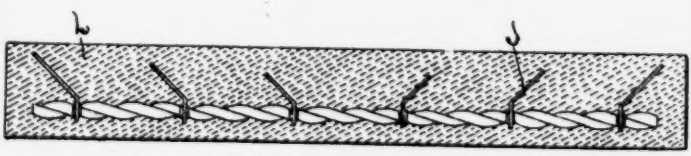


Fig. 19.



Witnesses.
A. D. Wilcox
Harold Ott

Inventor.
Julius Kahn
by Edward N. Pageler
his Attorney.

No. 768,284. Patented August 23, 1904.

UNITED STATES PATENT OFFICE.

JULIUS KAHN, OF DETROIT, MICHIGAN.

COMBINED STEEL AND CONCRETE BEAM.

SPECIFICATION forming part of Letters Patent No. 768,284, dated August 23, 1904.

Application filed January 20, 1904. Serial No. 189,798. (No model.)

To all whom it may concern:

Be it known that I, JULIUS KAHN, a citizen of the United States, residing at Detroit, in the county of Wayne and State of Michigan, have invented a new and Improved Combined Steel and Concrete Beam, of which the following is a specification.

This invention relates to a combined steel and concrete beam, and has for its object to provide for a longitudinal tension member for said beam supplemented with washers or deformations to insure better contact with the concrete body and to prevent stripping.

A further object of my invention is to construct the main tension-bar of uniform cross-sections in order that there may be no waste of material and to enable the use of a greater or less number of washers, as may be desired.

These objects I attain by the construction and arrangement of the parts, as illustrated in the drawings, and set forth in the description and claims.

In the accompanying drawings, Figures 1, 2, 3, 4, and 6 are views of a bar constructed in accordance with my invention, having washers of different forms. Fig. 5 shows a tension member in the form of a twisted square bar. Fig. 7 is a longitudinal section of the beam with the tension member in position. Figs. 8 to 13, inclusive, are cross-sections of the tension members shown in Figs. 1 to 6, inclusive, respectively. Fig. 14 is a cross-section of the beam shown in Fig. 7. Fig. 15 shows a square bar molded to give a round cross-section on each side of the washers. Fig. 16 is a cross-section through the alteration. Fig. 17 is a similar bar twisted. Fig. 18 is an enlarged cross-section through the alteration of the bar shown in Fig. 1. Fig. 19 shows a beam with the tension member of Fig. 17 in position.

Similar reference characters refer to like parts throughout the several views.

A is the main longitudinal bar, of round steel or similar material capable of resisting tension stresses. This bar is provided at points intermediate its ends with the washers B, which may be used in any desired number and placed at any desired distance apart, either uniformly spaced or preferably closer together at the ends of the bars. These washers B, as shown in Figs. 8 and 18, are square, with a circular opening in the center to fit on the bar A, which will also be circular in cross-section. After the washers have been placed on the bar an upsetting, distortion, or deformation of said bar (indicated by H) is made on either side of the washers for the purpose of holding them securely in position by placing the bar between two pairs of dies, the washer being between the pairs. When the dies are closed, a portion of the bar is squeezed out radially, so as to form a lug or ear H on each side of the washer, thereby rigidly securing the washer in place on the bar without reducing the cross-sectional area. These lugs are preferably formed in pairs, one on either side of the bar. The washers may be of any shape or size, as shown in the various figures, depending upon the shape and load of the beam.

Where square bars are used, either straight or twisted, I prefer to change the cross-section at the point of alteration of the cross-section from square to round, as shown in Figs. 15, 16, and 17, which may be done by using cylindrical dies. The diameter of a circle of unit area is 1.13, so that four strong lugs or shoulders M will be formed on the bar N on either side of the washers. The bar may be twisted either before or after the alteration of the cross-section; but I prefer to twist the bar after the washers are secured in place.

As shown in Fig. 5, the bar K is provided with spiral corrugations, which greatly increase the adhesion of the concrete. The washers in this figure are represented of varying sizes, smaller at the middle of the bar and increasing in size as they approach the ends. For the purpose of serving as binders for the concrete these washers would preferably be made rectangular or oblong and the greater length placed in a vertical line of the beam L. They may extend perpendicularly to the main longitudinal beam or may be inclined obliquely thereto, as represented in Figs. 6 and 17. In this modification the washers best perform the function of binding the concrete against shearing stresses and at the same time prevent the bar from stripping. It is

not necessary that these washers shall be of great weight or strength, but are preferably constructed of a comparatively light material.

The adhesion of concrete to a plain bar is considerable, but not sufficient in all cases to make a beam of symmetrical strength—that is, one in which the adhesion of the concrete necessary to prevent stripping will equal the tensile strength of the longitudinal metal bar. By the use of my invention these factors may be provided for as particular cases demand and the highest efficiency obtained by the reinforcement.

To form the beam, the tension-bar is suspended or otherwise supported in and near the bottom of the mold and concrete rammed around it, which when setting unites with the tension member, forming a beam of great strength, the tension member being below the neutral axis of the beam.

Having now explained my improvement, what I claim as my invention, and desire to secure by Letters Patent, is—

1. In a metal reinforcement for concrete, the combination of a tension member, of a plurality of metal blocks or washers placed upon the member at points intermediate its ends, said washers having arms projecting laterally from one side of the member, the cross-section of said member being changed to form shoulders for the support of said blocks.

2. In a beam, the combination of a tension member of uniform cross-section and uniformly twisted, of a plurality of auxiliary pieces placed upon said member at points intermediate its ends and inclined in opposite directions from the center and secured in position by deformations of said member on the opposite sides thereof, and a beam of plastic material surrounding said member.

3. In a beam, the combination of a longitudinally-disposed tension member, of auxiliary pieces placed upon said member at points intermediate its ends and secured in position by deformation of the member without varying its cross-sectional area, and a beam of plastic material surrounding said tension member, the tension member being below the neutral axis of the beam.

4. In a metallic reinforcement for concrete, the combination of a metallic bar longitudinally disposed, of auxiliary perforated members strung upon the bar and secured in place, said auxiliary members being inclined in opposite directions from the middle of said bar.

5. In a metallic reinforcement for concrete, the combination of a bar, rectangular in cross-section, and washers on said bar having rectangular openings, said bar being molded to circular cross-sections to form shoulders to support said washers.

6. In a metallic reinforcement for concrete, the combination of a twisted bar, rectangular in cross-section, and washers on said bar, said bar being molded to circular cross-section to form shoulders to support said washers.

7. In a metallic reinforcement for concrete, the combination of a bar, rectangular in cross-section, and washers on said bar having rectangular openings and being inclined in opposite directions from the middle of said bar, said bar being molded to circular cross-sections to form supporting-shoulders on each side of said washers.

8. In a metal reinforcement for concrete, the combination of a tension member, of a plurality of metal blocks or washers placed upon the member, at points intermediate its ends, and of a deformation of said member without varying its cross-sectional area whereby a shoulder is given for the support of said blocks.

9. In a reinforcement for concrete or similar material, the combination of a longitudinal bar of uniform cross-section, of a plurality of washers placed upon said bar at points intermediate its ends, and secured against longitudinal movement by deformations of the bar to form shoulders on opposite sides of the washers which distortions do not vary the cross-sectional area of the bar.

10. In a metal reinforcement for concrete, the combination of a tension member, of a plurality of auxiliary members placed upon the tension member intermediate its ends, said auxiliary members having arms projecting laterally from one side, the cross-section of said tension member being changed to form shoulders for the support of said auxiliary members.

In testimony whereof I have signed my name to this specification in the presence of two subscribing witnesses.

JULIUS KAHN.

Witnesses:
EDWARD N. PAGELSEN,
MAURICE GOLDENBERG.

No. 805,663.

PATENTED NOV. 28, 1905.

G. L. PEABODY.

REINFORCING DEVICE FOR CONCRETE CONSTRUCTION.

APPLICATION FILED SEPT 29, 1904.

Fig. 1.

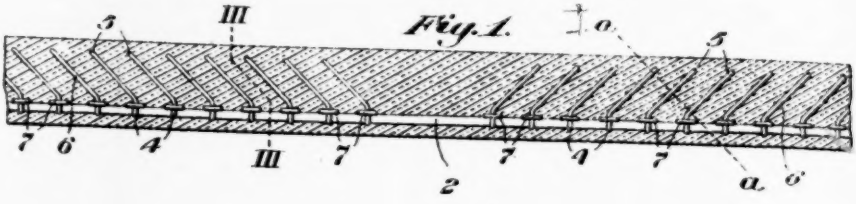


Fig. 2.

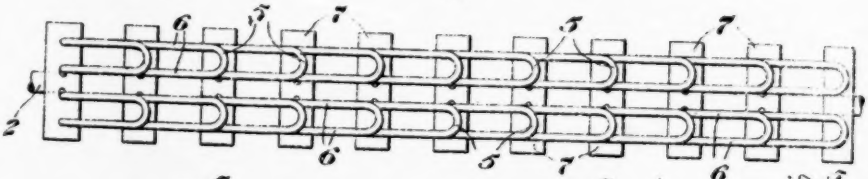


Fig. 3.

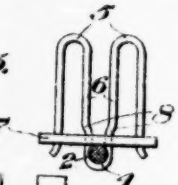


Fig. 4.

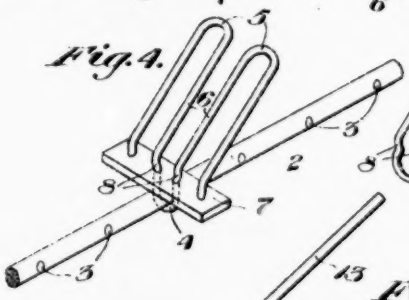


Fig. 5.

Fig. 8.

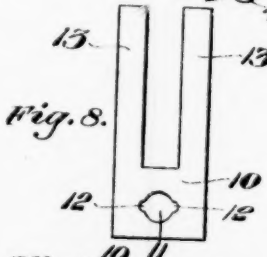


Fig. 6.

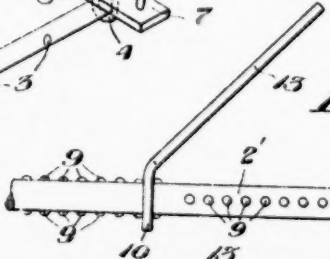


Fig. 9.

Fig. 7.

Fig. 10.

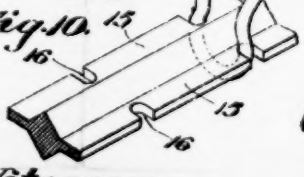


Fig. 11.

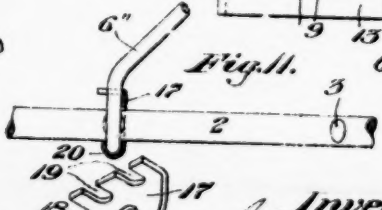


Fig. 12.

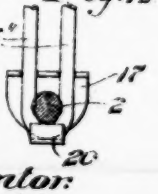


Fig. 13.

Witnesses:

A. H. King

Chas. S. Fepley

Inventor:

George L. Peabody

by C. M. Clarke

his Attorney

UNITED STATES PATENT OFFICE.

GEORGE L. PEABODY, OF PITTSBURG, PENNSYLVANIA.

REINFORCING DEVICE FOR CONCRETE CONSTRUCTION.

No. 805,663. Specification of Letters Patent. Patented Nov. 28, 1905.

Application filed September 29, 1904. Serial No. 226,526.

To all whom it may concern:

Be it known that I, GEORGE L. PEABODY, a citizen of the United States, residing at Pittsburg, in the county of Allegheny and State of Pennsylvania, have invented certain new and useful Improvements in Reinforcing Devices for Concrete Constructions, of which the following is a specification, reference being had therein to the accompanying drawings, forming part of the specification, in which—

Figure 1 is a view in side elevation of a portion of concrete construction provided with my improved reinforcing device. Fig. 2 is a plan view, on an enlarged scale, of one end of the device. Fig. 3 is a vertical cross-sectional view on the line III III of Fig. 1. Fig. 4 is a perspective view of the portion of the bar with one of the anchoring devices attached thereto. Fig. 5 is a modified form of holding-arm. Fig. 6 illustrates in side elevation a modified construction. Fig. 7 is a plan view of Fig. 6. Fig. 8 is an end view. Fig. 9 is a detail view showing the bar pinched around the plate. Fig. 10 is a detail view showing a different form of bar. Figs. 11 and 12 show a modified construction employing a supplemental holding-clip. Fig. 13 is a detail view showing the clip detached.

My invention relates to improvements in devices for incorporation with concrete structures—as bridges, beams, girders, walls, ceilings, floors, columns, &c.; and it has for its object to strengthen and reinforce the concrete body portion constituting the floor, &c., embedded therein and provided with projecting arms or branches arranged at any angle desired and so constructed as to be adjusted to suit the requirements of use and to make and maintain a strong binding hold in the cement or concrete at closely-adjacent intervals.

The invention is designed to provide a reinforcing device which will be capable of incorporation with the concrete in such a manner as to traverse the lines of probable fracture and counteract such fracture in the best possible manner, the device being provided with a closely-adjacent plurality of such arms or with arms or branches which may be adjusted to the intervals desired or required by the work in view.

Referring now to the drawings, 2 represents the main element of the device consisting of a bar of metal of any suitable cross-section, but preferably cylindrical. The bar is provided at intervals with notches or grooves 3 on opposite sides, around which are passed the looped portion 4 of the arms, which are then extended upwardly beyond the bar 2 and bent at any desired angle and looped, as at 5. The arms are made of a heavy wire or rod 6 and may be then turned backwardly, as shown in the principal figures of the drawings, and their terminal portions connected in a cross bar or clamp 7 of any suitable construction, by which the entire arm may be tightly secured in position and to the bar 2. For the purpose of insuring the gripping action of the arms upon the bar they may be abruptly bent, as at 8, thereby forming a shoulder on the upper side of bar 7, so as to prevent their loosening or removal, and as thus constructed the arms will be rigidly attached to the main bar. It will be seen that the arms may be closely assembled, as indicated in Figs. 1 and 2, and that as thus located they cross the line of fracture, as *a a*, at least three times, thereby providing strong counteracting reinforcing devices, which effectually perform their functions. It is designed that the arms may be incorporated with the main bar at the place where used—as, for instance, in a building under construction—which feature greatly facilitates the shipment and handling of the different parts, their assemblage being a matter of simple and easy accomplishment by any mechanic.

It will be understood that any suitable device may be used for the arms, and in Figs. 6, 7, and 8 I have shown a bar 2', provided with series of abutments 9, located in oppositely-arranged series of rows with an intervening space between the abutments for the insertion of a holding-arm of the character shown in these figures, made of a plate of sheet metal 10, having an aperture 11 for the bar and registering openings or slots 12 to facilitate its insertion upon the bar, the plate being provided with one or more upwardly-bent projections 13, arranged at any suitable or desired angle, as already described.

In Fig. 9 the bar 2'' is originally smooth on its exterior, the plate 10 or any other suitable branch device being provided with a corresponding aperture slipped over the bar and secured thereon by holding-lugs 14, pinched or upset from the metal of the bar, so as to securely bind on each side of the plate and hold it in position, the plates being thus attached at any desired interval apart.

In Fig. 10 the bar is shown as provided with lateral flanges 15 15, having notches or apertures 16 at the desired distances apart,

which engage the arms 6′, as shown, the arms being tightened or fastened upon the bar in any suitable manner.

In Figs. 11 and 12 the bar is provided with the notches 3, already described, the arm extremities 6″ being attached in the manner shown, and are further secured by a supplemental clip 17, consisting of a plate of sheet metal having an opening 18 for the bar and apertures 19 in its upper edge, which edge may be bent over, the clip being provided with a terminal tongue 20, which is bent up around the lower portion of the arms, as shown, thereby securely attaching it to the main bar.

All of these various devices are suitable for the objects in view and provide a main bar having rigidly-connected projecting arms capable of being bent to any desired angle and to maintain their position with relation to the bar, so as to transmit to it the various strains to which the concrete structure is subjected.

It will be understood that various other devices or constructions of holding-arms may be incorporated with the bar, and all such various changes or modifications which may be made by the skilled mechanic are to be considered as within the scope of the following claims, as I do not desire to be limited to the exact construction shown and described.

Having described my invention, what I claim is—

1. A reinforcing device for concrete, &c., consisting of a main bar provided with a series of notches, and holding-arms surrounding the bar in engagement with said notches and projecting laterally from the bar, substantially as set forth.

2. A reinforcing device for concrete, &c., consisting of a main bar provided with a series of notches, holding-arms surrounding the bar in engagement with said notches and projecting laterally from the bar, with securing devices for the arms, substantially as set forth.

3. The combination with a main bar provided with a series of notches formed between adjacent shoulders, of holding-arms surrounding the bar and in engagement with said shoulders, and provided with apertures adapted to provide clearance therefor in assembling the arms with the bar, substantially as set forth.

4. The combination with a main bar provided with a series of notches, of oppositely-disposed series of holding-arms surrounding the bar in engagement with said notches and projecting laterally from the bar and toward each end respectively beyond its middle portion, substantially as set forth.

5. A reinforcing device for concrete, &c., consisting of a main bar provided with a series of notches, and holding-arms surrounding the bar in engagement with said notches and projecting upwardly and outwardly toward the ends of the bar, substantially as set forth.

In testimony whereof I affix my signature in presence of two witnesses.

GEORGE L. PEABODY.

Witnesses:
R. H. McLAREN,
C. M. CLARKE.

No. 815,157. PATENTED MAR. 13, 1906.

J. F. GOLDING.

TENSION BAR FOR USE IN CONCRETE AND THE LIKE.

APPLICATION FILED FEB. 20, 1905.

Fig. 1.

Fig. 2.

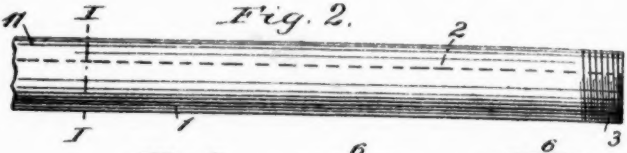


Fig. 3.

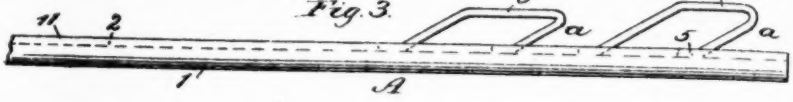


Fig. 4.

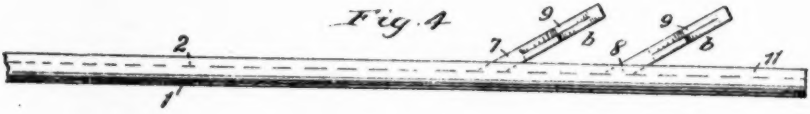


Fig. 5.

Fig. 7.

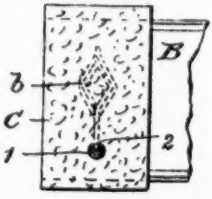


Fig. 10.

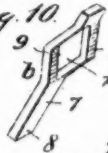


Fig. 6.

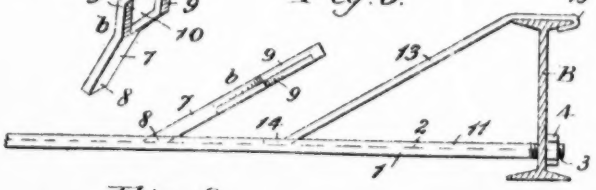


Fig. 8.

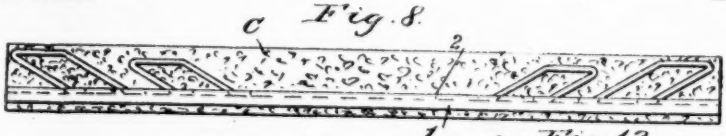


Fig. 9.

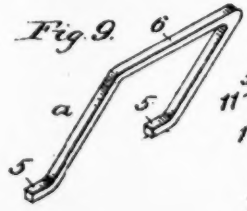


Fig. 11.

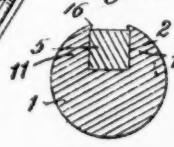


Fig. 12.

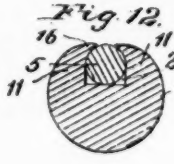
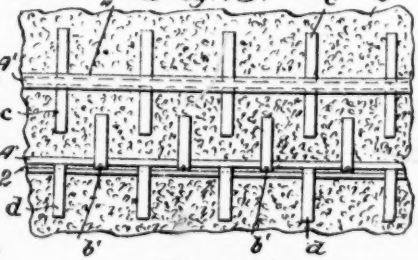


Fig. 13.



Witnesses:
J. S. Barker
Geo. B. Pettit.

Inventor:
John F. Golding
by H. N. Low
Atty.

UNITED STATES PATENT OFFICE.

JOHN F. GOLDING, OF WASHINGTON, DISTRICT OF COLUMBIA, ASSIGNOR TO MONOLITH STEEL COMPANY, INCORPORATED, A CORPORATION OF VIRGINIA.

TENSION-BAR FOR USE IN CONCRETE AND THE LIKE.

No. 815,157. Specification of Letters Patent. Patented March 13, 1906.

Application filed February 20, 1905. Serial No. 246,609.

To all whom it may concern:

Be it known that I, JOHN FRENCH GOLDING, a citizen of the United States, residing at Washington, District of Columbia, have invented certain new and useful Improvements in Tension-Bars for Use in Concrete and the Like, of which the following is a specification.

My invention relates to the strengthening of cement, concrete, and the like where these materials are employed in various structures, and it consists in a tension-bar adapted to be embedded in or surrounded by such materials, the bar comprising a main longitudinal member and inclined members provided with concrete engaging or locking portions which are so arranged as to obtain a positive hold upon the material at a distance from the bar as distinguished from a mere skin frictional engagement, whereby the cracking of the material is prevented when the structure is subjected to strain and the separation of the different parts of the body of material from each other or from the said main member is rendered impossible.

It further consists in a tension-bar of peculiar construction; also, in such a bar suitably embedded in concrete or the like; also, in the parts and combinations thereof hereinafter set forth and claimed.

In order to make the invention clearly understood, I have shown in the accompanying drawings means for carrying the same into practical effect without limiting my improvements in their useful applications to the precise constructions and arrangements which, for the sake of example, I have delineated.

In said drawings, Figure 1 is a sectional view of the main longitudinal member of a tension-bar embodying my invention on line I of Fig. 2. Fig. 2 is a side view of a portion of said main member. Fig. 3 is a side view, on a smaller scale, of a portion of my improved tension-bar, showing two of the inclined or supplemental members combined with the main longitudinal member. Fig. 4 is a similar view showing supplemental members of a different form also embodying the invention. Fig. 5 is a side view showing another form of supplemental member. Fig. 6 is a side view, partly in section, of a portion of the tension-bar united with one of the floor-beams. Fig. 7 is a sectional view at right angles to Fig. 6, showing also the body of concrete around the tension-bar. Fig. 8 is a vertical sectional view of a concrete floor or beam containing a tension-bar of the form shown in Fig. 3. Figs. 9 and 10 are perspective views of the supplemental members shown, respectively, in Figs 3 and 4. Figs. 11 and 12 are sectional views across the tension-bar at the point where it is united with a supplemental member, said views showing, respectively, a supplemental member of square cross-section and one of round cross-section. Fig. 13 is a plan view, partly in section, of a portion of a floor having tension-bars embodying my invention, in this instance the supplemental members extending horizontally on each side of the grooved member.

I have herein shown and described the tension-bar as combined in a floor; but it will be understood that the invention is not confined to use in such particular structure. The word "concrete" as used herein is intended to cover all built-up structures of similar or analogous materials.

Referring to the drawings, 1 indicates the main or longitudinal member of the tension-bar A, made of suitable material, such as iron or steel, to have the necessary tensile strength. The member 1 is rolled or otherwise formed with a longitudinal surface-groove 2, extending for a portion of or by preference for the entire length of the member and leaving a relatively heavy main body from and beyond which extend the opposing lips 11. When the bar A is combined in a floor, as shown in Figs. 7 and 8, the member 1 is laid substantially horizontally with the groove 2 on the upper side. The member 1 is or may be provided at its ends with screw-threads 3 and nuts 4, as indicated in Figs. 2 and 6.

In Fig. 3 the supplemental members are shown at *a* extending in an inclined direction upward and away from the member 1. They are provided with feet 5, securely held in the groove 2 and at a distance from the member 1, with concrete engaging or locking portions 6 arranged crosswise of or at an angle to the general direction of the supplemental member, so as to obtain a positive hold or lock on or in the concrete. Thus the portions 6 may be parallel with the member 1, as shown in Figs. 3, 5, and 8. In this particular construction of supplemental member (shown at *a*) it is formed of a bar of metal the middle of which

forms the engaging or locking part 6, the ends of which are legs extending in an inclined direction to the member 1 and the extremes of which constitute the feet 5. In order to effect the most economical distribution of metal, I usually pfefer to make the supplemental members progressively a little longer or higher as the end of the main bar is approached, as indicated in Figs. 3, 5, and 8.

Another form of supplemental member is shown in Figs. 4, 6, 7, and 10 at *b*, the same having a single leg 7 and foot 8. The concrete engaging or locking portions are formed by the limbs 9 of eyes or loops 10. The latter are of diamond or other suitable shape. The members shown at *b* are or may be short sections of the tension-bar which is the subject of my Patent No. 758,061, dated April 26, 1904. The legs of the supplemental members may extend at right angles to the bar 1 instead of being inclined, as seen in Fig. 5.

The tension-rod described is or may be delivered in a knockdown condition, the supplemental members separate from the main member 1. The parts are then assembled according to the requirements of the floor or other structure, the supplemental members being spaced apart or arranged as desired in the groove 2 of the member 1, and the feet of the supplemental members are secured by forcing inward the lips or parts 11, which extend outward from and beyond the main body of the member 1, with a suitable press or swage, so as to permanently set the metal of the member 1 against or onto the sides of the supplemental members. The tension-bar A may, however, be completed for use at the factory, in which case the parts may be permanently united by a rolling process, the bar with the supplemental members inserted in its groove being passed between grooved rollers suitably shaped to upset, bend, or compress the metal of the member 1, as desired.

The preferred manner of attaching the tension-bar to the supporting-beams is shown in Fig. 6, where one of such beams is indicated at B. The end of the member 1 is inserted through an aperture in the lower part of the vertical web of the beam, and the nut 4 is set up against the web. The other end of the member is similarly secured to another beam. 13 is a tie-rod having a foot 14 secured in the described manner in the groove 2 and which extends thence in an inclined direction to the top of the beam, where it is provided with a hook 15, which engages the top flange or other convenient part of the beam. The tie strengthens and supports the member 1, strengthens the concrete at one of its points most subject to heavy strain, and keeps the tension-bar A upright during building.

The supplemental members may be of square, round, or other cross-section. The thickness of the supplemental member or of its foot may be a little less than the depth of the groove 2, Figs. 11 and 12, in which case the edges of the groove are or may be bent partly over or around the foot of the supplemental member, as indicated at 16 in said figures.

C is a body of concrete representing a floor, beam, or other structural element. It incloses the bar A and enters the spaces between or within the supplemental members.

In Fig. 13 I have shown supplemental members consisting of plain straight bars secured in the grooved bars, as already described. In this construction the supplemental members are arranged horizontally. The bar shown at A′ has two of the described grooves opposite to each other, one on each side of the bar, and the supplemental members *c* are secured some in one groove and some in the other, extending in opposite directions from the grooved bar. The bar shown at A is similar to that shown in the other figures and has the groove on its upper side. The supplemental members *d* have downwardly-bent feet *b*′, seated in the groove 2, and thence extend horizontally to each side of the bar A.

Where tension-bars are constructed with the supplemental or concrete-locking members integral with the part or parts that act as tension members, the latter cannot well be of the highest tensile strength on account of the concomitant hardness and the difficulty of cutting and forming the supplemental members from it. My present improvement allows the member 1 to be made of the highest tensile strength without encountering said difficulty, and I can get the same structural strength with less metal and weight. Also I am enabled to closely adapt the tension-bar at the place of building to the requirements of the structure, doing away with the necessity of having made to order at the factory in complete form the various tension-bars for the different parts of the building. It will be further noticed that the described means for securing the supplemental members to the member 1 leaves to the latter the full tensile strength of the metal which is contained in it. In other words, there is no metal which is wasted for tensile purposes, as would be the case if the member 1 were perforated or cut away on transverse lines.

The feet of the supplemental members are extended longitudinally in the groove of the main bar sufficiently to enable the bar to have a firm and secure hold on the supplemental member. This may be effected in different ways—for instance, by making the supplemental member wide in the direction of the groove, as shown at 8, Figs. 6 and 10, or by bending such feet in a direction parallel with the groove, as shown at 5, Figs. 3 and 9. It is to be understood that the word "ten-

sion" is herein used in connection with the bar 1 to indicate its general function in receiving the strains imposed by the concrete and its load and not in such a narrow sense as to exclude the use of my improvement from columns or other situations in which it would receive other than simple tension strains. Important advantages result from making the main bar 1 with a continuous groove or grooves. When of such shape, it can be very economically produced by a rolling process. The groove-producing flange of the roll enters and rolls and finishes the interior of the bar to a material degree, thereby giving to the bar an extra amount of rolled tough skin or surface and increased tensile strength. The bar is or may be of uniform cross-section, having no waste metal which is not utilized for strengthening purposes. The supplemental members can be arranged at any desired points along the bar, according to the requirements of the structure or building, and there secured with the greatest firmness. The grooves at their portions which are not occupied by the supplemental members are open to receive the concrete or cement and unite the bar with the same against lateral strains, giving the bar also a strong frictional hold on the concrete to prevent longitudinal displacement. In assembling the supplemental members with the bar the former will readily become seated in the groove without its being necessary to exercise great particularity as to their exact location longitudinally of the bar. The parts can be united by a simple rolling process, the bar having the supplemental members inserted in its groove or grooves being passed between rolls, which act on it from end to end and bring the walls of the groove or grooves to bear securely against the sides of the supplemental members. If the bar is not of too great cross-section, such assembling-rolls may compress the bar as a whole to bring the walls of the grooves nearer together; but my improvements are not to be limited to such precise mode of securing the parts together. If the bar be of such size that it cannot be readily compressed as a whole, I may cause the rolls to act along those parts of the bar between which the groove is situated or I may use a swaging process, as already explained.

What I claim is—

1. The combination, with a body of concrete, of a metal bar supporting such concrete and formed with a continuous longitudinal groove, and one or more supplemental members arranged in said groove at the desired points in the length of the bar and secured in the groove, substantially as and for the purposes described.

2. A metal strengthening-bar for use in concrete and the like, said bar being formed with a continuous longitudinal groove, in combination with one or more supplemental members adjustable along the groove of the bar to the desired points, the bar being adapted to be upset to secure the supplemental members, substantially as and for the purposes described.

3. The combination, with a body of concrete, of a metal bar surrounded by such concrete and formed with a continuous longitudinal groove, and one or more supplemental members secured in such groove, the open portion of the groove being adapted to receive therein, and obtain a hold on, the concrete, substantially as and for the purposes described.

4. A tension-bar for use in concrete and other purposes, consisting of a main, longitudinal, continuously-grooved member, and supplemental members arranged at desired points along the groove of said main member and having their feet or ends extending longitudinally in the groove, the metal of the main member being permanently upset to cause the walls of the groove to rigidly secure said supplemental members, substantially as set forth.

5. A tension-bar consisting of a main, longitudinally and continuously grooved member 1, and a supplemental member *a* formed with a longitudinal portion 6 arranged at a distance from the main member and with legs extending to said main member, the ends of said legs being arranged within the groove of the main member and the metal of the main member being permanently upset to cause the walls of the groove to rigidly secure such ends, substantially as set forth.

6. A tension-bar adapted to be supplied in an unassembled or knockdown condition, consisting of a main longitudinal member formed with a continuous groove 2, and supplemental members having parts fitting said groove and adapted to be arranged along such groove and spaced apart as desired, the main member being of malleable material for the securing of the supplemental members by the permanent upsetting of the material of the main member as described.

7. The combination of the tension-bar, consisting of a longitudinal and continuously-grooved member, beams supporting the ends of said longitudinal member and a tie engaging the upper part of the beam, extending in an inclined direction to said longitudinal member and having its end or foot secured by compression in the groove of the longitudinal member, substantially as set forth.

8. In combination with a body of concrete or the like, a tension-bar consisting of a main longitudinal member having a relatively heavy main body and formed with opposing lips extending outward from and beyond the main body, such lips producing a continuous groove wherein the concrete can enter, and

supplemental members arranged at desired points along the said main member and having their feet or ends between such lips, such main member having its metal permanently upset to cause the lips to rigidly secure such supplemental members, and said body of concrete being arranged to surround and engage the bar and the supplemental members and to enter between said lips of the bar, substantially as set forth.

In testimony whereof I affix my signature in presence of two witnesses.

JOHN F. GOLDING.

Witnesses:
H. N. Low,
Wm. H. De Lacy.

No. 815,617. PATENTED MAR. 20, 1906

W. MUESER.

MATERIALS OF CONSTRUCTION.

APPLICATION FILED OCT. 13, 1904.

Fig. 1.

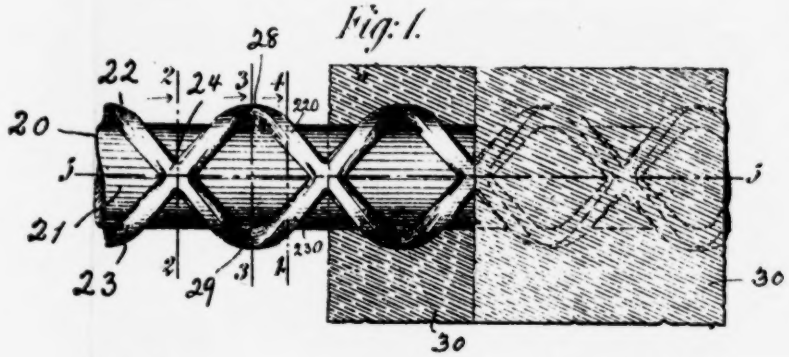


Fig. 2.

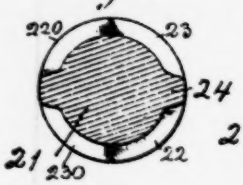


Fig. 4.

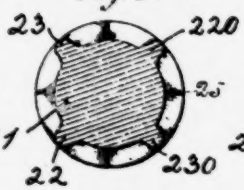


Fig. 3

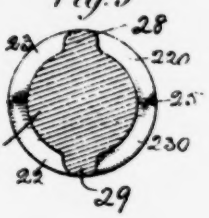


Fig. 5.

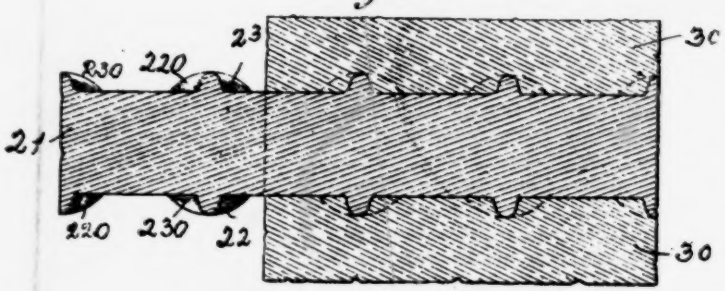


Fig. 6.

Witnesses:
Alan McDonnell
Beverley [illegible]

William Mueser Inventor

By His Attorney William R. Baird

UNITED STATES PATENT OFFICE.

WILLIAM MUESER, OF NEW YORK, N. Y.

MATERIAL OF CONSTRUCTION.

No. 815,617. Specification of Letters Patent. Patented March 20, 1906.

Application filed October 13, 1904. Serial No. 228,342.

To all whom it may concern:

Be it known that I, WILLIAM MUESER, a citizen of the United States, and a resident of New York, in the county of New York and State of New York, have invented certain new and useful Improvements in Materials of Construction, of which the following is a specification.

My invention relates to concrete-steel construction, and its novelty consists in the construction and adaptation of the parts, as will be more fully hereinafter pointed out. In structures of this class the ideal to be attained is to provide a core or bar of steel in a surrounding envelop of concrete, each so fashioned with respect to the other that the strength of the unit throughout shall be uniform and so interlocked that no separation or rupture can occur between the metal and its plastic envelop and no sliding or slipping can take place between their contacting surfaces. Engineers have sought to solve this problem by providing steel bars with depressions and elevations arranged in numerous forms; but so far as known to me such bars if they meet the requirement of substantially uniform ultimate or breaking strength they have no uniform elongation, or stretch under stress, or are of such shape that they are difficult to manufacture, or have sharp corners and edges which cut into the surrounding envelop when strained, or have some bad quality, such as a tendency to slip or twist.

I have invented a form of bar to be used in combination with a concrete envelop as a unit of construction which I believe possesses the ideal advantages above referred to and has none of the disadvantages stated. In brief, it consists of a core of steel comprising a longitudinal body provided externally with continuous ribs wound spirally around the body of the bar in opposite directions and intersecting at regular intervals. The cross-section of the rib outside of the body of the bar is tooth-shaped. The concrete being placed in between the diamond-shaped depressions formed by the intersecting spiral ribs and also surrounding the entire surface of the bar, the latter is held in place without being permitted to be twisted or rotated or pulled out under any strain which will not rupture the body of the bar itself.

In the drawings, Figure 1 is a longitudinal elevation of a bar embodying my invention, showing the concrete envelop in section in two planes, the outline of the bar being shown dotted where it is concealed. Fig. 2 is a transverse section on the plane of the line 2 2 in Fig. 1. Fig. 3 is a similar section on the plane of the line 3 3 in Fig. 1. Fig. 4 is a similar section on the plane of the line 4 4 in Fig. 1. Fig. 5 is a longitudinal central section through the bar and its envelop on the plane of the line 5 5 in Fig. 1, and Fig. 6 is an elevation of the bar without its surrounding envelop.

In the drawings, 20 is a bar of metal which has been rolled or otherwise shaped into the form shown in Figs. 1 and 6. It is composed in this instance of a substantially cylindrical body 21 and is provided externally with one or more spiral ribs or projections, as at 22 220, running around the body in one direction, and one or more ribs or projections, as at 23 230, running around the body in an opposite direction, the ribs intersecting those running in the opposite direction at substantially regular intervals, as at 24, 25, 26, 27, 28, and 29, at what are practically right angles. The ribs 22 220 and 23 230 are preferably made continuous and integral with the body of the bar. The ribs themselves may be made of any approved form in cross-section; but the preferable form somewhat resembles that of the teeth of ordinary cog-wheel gearing, as shown in Fig. 4. If the bar be cut by several planes at right angles to its longitudinal axis, as shown in Figs. 2, 3, and 4, it will be noticed that the cross-sectional areas of the ribs at their intersections 24, 28, and 29, for instance, as shown in Figs. 2 and 3, are about equal to their cross-sectional areas when cut separately by a similar intersecting plane, as shown in Fig. 4. Wherever the two spiral ridges meet, the angle between the ridges is rounded out just enough to make the areas of the intersections 28 and 29, as shown in Fig. 3, equal to areas of the separate ribs 22 and 23 of any cross-section, as shown in Fig. 4. In other words, the cross-sectional area of the bar, including that of the body and ribs, is substantially constant at all points along its length. From this it follows that the bar is of substantially uniform strength throughout. It will be understood, of course, that each bar is embedded in a concrete envelop 30.

This form of bar has several advantages:

First. The spiral ribs can be made as high as may be desired and so as to develop the full strength of the bar without losing its uniform strength or any of the other advantages that

this bar possesses. By developing the full strength of the bar I mean that it shall be so firmly held in its envelop that it is impossible to pull the bar out of the surrounding concrete envelop and that if the effort is made the bar itself must rupture, but not pull out. It is evident, therefore, that I can make the ribs high enough to effect the result absolutely; but whatever the relative height of the ribs to the diameter of the bar the cross-sectional area remains uniform, and therefore also the strength. The importance of this advantage will be seen if it is remembered that bars which have heretofore been used have been provided with corrugations or projections for the purpose of gaining a hold on the surrounding envelop, but which were of such shape that the uniformity of the area of the cross-section was destroyed, resulting in a loss of metal of from five to twenty per cent., or, in other words, the metal projections used for engaging the envelop did not add to the strength of the bar itself, or only partially so. This being not the case in my bar, it has the further advantage that—

Second. On account of the uniformity of the cross-sectional area every particle of metal in the bar contributes to the working strength of the bar, and my bar must, therefore, be the most economical.

Third. For the same reason my bar is of uniform ultimate or breaking strength.

Fourth. Another advantage still more important than the uniform breaking strength of my bar is the uniform elongation under working stresses and before the elastic limit of the metal in the bar is reached—that is, if my bar is, in tension or compression, in its longitudinal axis, as it would be when actually used in building construction—all equal intervals between any two cross-sections of the bar elongate or shorten a like amount. The cause of this uniformity of elongation can be explained as follows: If we consider two closely-adjoining cross-sections of the bar, we have in either the circular area of the bar and in addition four projections representing the cross-section of the four ribs. The only difference between these two sections is to be found in the location of the four projections relative to the center part of the bar, two and two of the projections nearing each other a certain amount: If we consider a third cross-section, equally distant from the second as the second is from the first, we find the same condition repeated—that is, two and two projections have again neared each other an equal amount and as much as was the case between the first and second sections. So on, if consecutive cross-sections equally distant from each other are considered, we find that two and two projections consecutively come closer and closer together at perfectly uniform ratio until each two of the projections meet, which point represents the crossing-points of the spirals, and as soon as each two projections meet, having formed one projection of substantially double width, they separate again and in consecutive cross-sections they go farther and farther apart at the same ratio as they were nearing each other until the cross-section at the next point where the two spiral ribs cross is reached, and so on. It is therefore quite evident that when this bar is rolled the rolls of the mill must exert exactly the same pressure in rolling a part of the bar which lies between any two cross-sections above discussed. In other words, on account of the similar character of all cross-sections of the bar and on account of the uniform ratio of change in location of the projections representing the spiral ribs the metal must flow through the rolls perfectly uniformly and under the same amount of pressure. Since, therefore, the character and amount of pressure which are necessary to form any part of the bar are uniform, it is clear that the bar must have uniform elongation. We know from experience that other forms of bars do not have this advantage, because on account of their form one section of the bar has to be pressed much harder and differently in manufacture than many other sections, and frequently there are sudden changes in form of adjoining sections which prevents a uniform flow of the metal through the rolls. The matter of uniform elongation is very important in practice, as the bars naturally are not used up to the breaking-point, but inside of the elastic limit of the material.

Fifth. Another advantage follows from the reasoning just above made, together with the fact that there are two spiral continuous ribs which at all points form the same angle with the longitudinal center line of the bar, which is that the ribs provide a continuous uniform hold of the same character for the surrounding concrete envelop along the full length of the bar, while other forms of bars provide a hold on the surrounding concrete only at shorter or longer intervals.

Sixth. The double spiral counteracts effectively any tendency to twist or turn under stress.

Seventh. My bar has no sharp edges or corners, which under stress would have a tendency to cut into the concrete envelop, but that, on the contrary, it will be noticed that while the whole surface of the bar is easily and effectively engaged by the concrete envelop there are no sharp corners to induce cutting.

What I claim as new is—

1. A bar adapted to be used as a core to be embedded in concrete comprising a regularly-formed central body provided with external projecting ribs extending a substantial part of the length of the body, one of said ribs extending diagonally around the body in one direction and another of said ribs extend-

ing diagonally around the body in an opposite direction and intersecting the first rib.

2. A bar adapted to be used as a core to be embedded in concrete comprising a regularly-formed central body provided with external projecting ribs extending a substantial part of the length of the body, one of said ribs extending diagonally around the body in one direction and a plurality of said ribs extending around the body in an opposite direction and intersecting the first rib.

3. A bar adapted to be used as a core to be embedded in concrete comprising a regularly-formed central body provided with external projecting ribs extending a substantial part of the length of the body, a plurality of said ribs extending diagonally around the body in one direction and a plurality of said ribs extending diagonally around the body in an opposite direction and intersecting the first-named plurality of ribs.

4. A bar adapted to be used as a core to be embedded in concrete comprising a regularly-formed central body provided with external projecting ribs extending a substantial part of the length of the body, one of said ribs extending diagonally around the body in one direction and another of said ribs extending diagonally around the body in an opposite direction and intersecting the first rib, the transverse section at the intersection of the ribs being increased to produce along the whole bar a substantially uniform cross-section.

5. A bar adapted to be used as a core to be embedded in concrete comprising a regularly-formed central body provided with external projecting ribs extending a substantial part of the length of the body, one of said ribs extending diagonally around the body in one direction and a plurality of said ribs extending diagonally around the body in an opposite direction and intersecting the first rib, the transverse section at the intersection of the ribs being increased to produce along the whole bar a substantially uniform cross-section.

6. A bar adapted to be used as a core to be embedded in concrete comprising a regularly-formed central body provided with external projecting ribs extending a substantial part of the length of the body, a plurality of said ribs extending diagonally around the body in one direction and a plurality of said ribs extending diagonally around the body in an opposite direction and intersecting the first-named plurality of ribs, the transverse section at the intersection of the ribs being increased to produce along the whole bar a substantially uniform cross-section.

Witness my hand this 11th day of October, 1904, at the city of New York, in the county and State of New York.

WILLIAM MUESER.

Witnesses:
HERMAN MEYER,
ALAN MCDONNELL.

No. 822,587. PATENTED JUNE 5, 1906.

R. A. CUMMINGS.

METAL REINFORCED CONCRETE COLUMN.

APPLICATION FILED JAN. 6, 1905.

FIG. 1

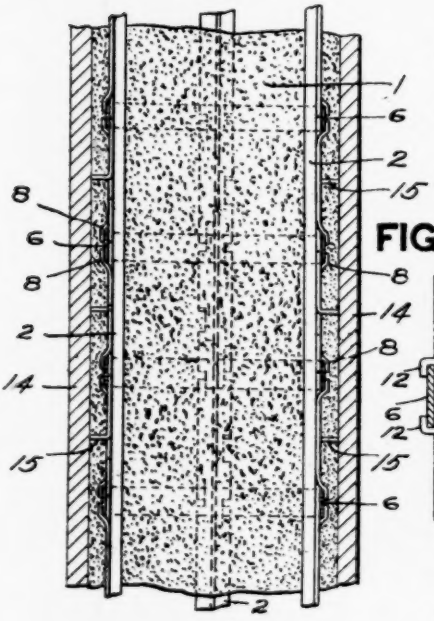


FIG. 2

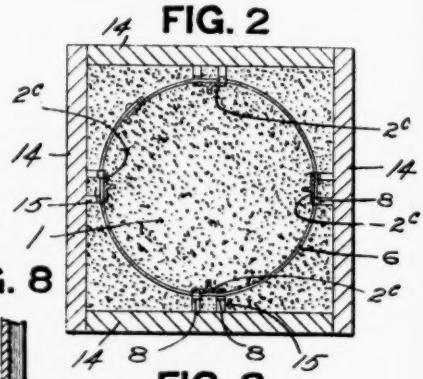


FIG. 8

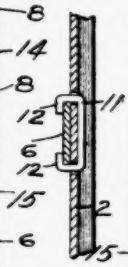


FIG. 3

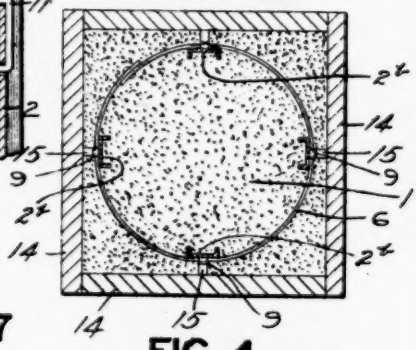


FIG. 5

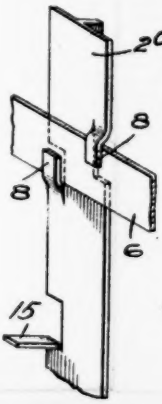


FIG. 6

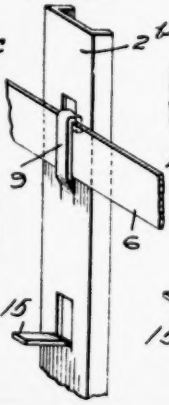


FIG. 7

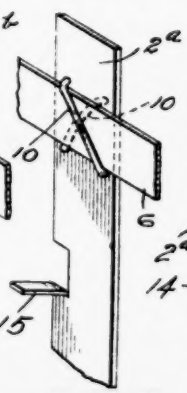


FIG. 4

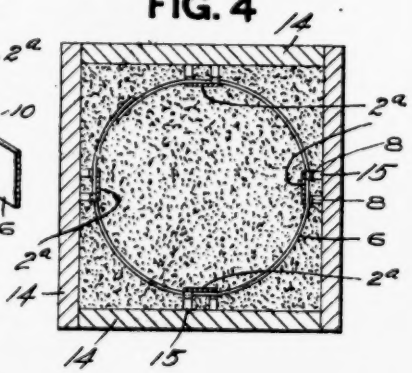
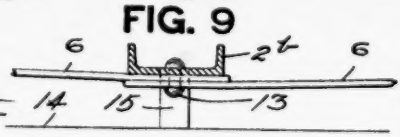


FIG. 9



WITNESSES.

J. R. Keller

Robert C. Totten

INVENTOR.

Robert A. Cummings

By King Totten & Waite

attorneys

UNITED STATES PATENT OFFICE.

ROBERT A. CUMMINGS, OF BEAVER, PENNSYLVANIA.

METAL-REINFORCED CONCRETE COLUMN.

No. 822,587 Specification of Letters Patent. Patented June 5, 1906.

Application filed January 6, 1905. Serial No. 239,887.

To all whom it may concern:

Be it known that I, ROBERT A. CUMMINGS, a resident of Beaver, in the county of Beaver and State of Pennsylvania, have invented a new and useful Improvement in Metal-Reinforced Concrete Columns; and I do hereby declare the following to be a full, clear, and exact description thereof.

My invention relates to concrete columns, piles, struts, and the like used in bridges, viaducts, docks, fireproof buildings, and other structures.

The object of my invention is to provide a column or the like which is composed mainly of cement or concrete and which will carry a very heavy load.

Concrete or cement possesses great compressive strength when properly constructed and supported and is also not affected by fire, water, or other elements. For these reasons it is highly desirable in many building constructions. It possesses, however, slight tensile strength, so that when subjected to very heavy loads the concrete will be forced apart laterally, and thus fracture the column.

In my Patent No. 764,883, July 12, 1904, I have described and claimed a column construction wherein the fracturing due to the lateral spreading of the concrete is overcome, this being accomplished by surrounding the main body of the concrete with a series of flat metallic bands which will prevent the concrete from spreading, and consequently from fracturing.

The present invention is an improvement on the column described in my aforesaid patent, one object being to increase the stability of the column by the use of vertical reinforcing members having a cross-section in which the metal is so distributed that the major portion thereof will be as far removed as possible from the center of the column, thus increasing the radius of gyration.

A further object of the invention is to provide means on the vertical members, whether of the character above described or otherwise, for holding them properly spaced from the casing, so that said members will be uniformly distributed in the concrete and be entirely embedded therein.

A further object is to provide improved means for holding the transverse bands against either downward or upward movement.

To these ends the invention consists in details of construction and arrangement hereinafter described and claimed.

In the accompanying drawings, Figure 1 is a vertical section through a column constructed according to my invention. Fig. 2 is a transverse section thereof. Figs. 3 and 4 are similar views showing modifications. Figs. 5, 6, and 7 are perspective views showing different manners for holding the bands against movement. Fig. 8 is a vertical section of another modification, and Fig. 9 is a horizontal detail section of still another modification.

In the drawings the concrete is shown at 1, and the vertical reinforcing members at 2. The latter may be variously arranged and located, depending upon the size and shape of the column. They will be of a cross-section, having the metal so distributed that the major portion thereof will be as far out from the center of the column as possible, so as to get the greatest radius of gyration and correspondingly increasing the stability of the column. The most advantageous cross-section to secure this result is a flat rectangular bar, strip, or band, such as shown at 2^a, Fig. 4. Preferably, however, these reinforcing members will be slightly stiffened by providing them with one or more inwardly-projecting flanges, either by using a channel-section, as shown at 2^b, Fig. 3, or a modified angle or T-section, the latter being shown at 2^c, Figs. 1 and 2. The inwardly-projecting flange or flanges of the angle, channel, or T sections greatly stiffen these reinforcing members. The metal nevertheless is so distributed that the major portion thereof is in the web of the channel or in the head of the T-bar, and as these are directed outwardly the radius of gyration is correspondingly large. In my design these vertical members are not intended to act as compression members, although they probably do so to some extent, but they act as tension members to prevent the flexing of the column. They also serve as means for supporting bands 6, which extend transversely of the column and envelop the major portion of the concrete body, these bands serving to hold the concrete against fracturing laterally, and thereby developing the greatest compressive strength of said concrete. The bands 6 therefore will preferably be flat and arranged with their flat

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faces vertical; but they may be of other cross-section. They will be located comparatively closely together, so as to confine the major portion of the body of the concrete. These bands will have their ends united to form continuous bands in any suitable way, either in the manner shown in my patent aforesaid, or as illustrated in my application filed October 22, 1904, Serial No. 229,635, or by riveting the ends of the bands together, as shown in the drawings, or any other suitable way. One feature of the present invention consists in the manner of securing these bands to the vertical members, so as to prevent their movement vertically. Preferably this connection will be so arranged that the bands can neither rise nor fall, thus preventing them from becoming spaced apart irregularly or from assuming a diagonal position.

As shown in Figs. 1, 2, and 5, the vertical members have punched out from their opposite edges the tongues 8, which are arranged diagonally and engage the two edges of the bands and hold the same securely in place and against either falling or rising. The diagonal arrangement of these tongues provides for the easy insertion of both edges of the bands underneath said tongues.

In Fig. 6 there is only one tongue 19, whose upper end is bent across the top of the band to hold it from rising.

In Fig. 7 the bands are shown held in place by means of a staple 10 or the like, embracing the band and having its ends projecting through openings in the vertical member and upset or bent on the back. If desired, two such staples may be used, as indicated in the dotted lines.

In Fig. 8 the staple 11 is located on the rear of the vertical member and has its ends 12 projecting through openings in the vertical members and bent over the front face of the band.

In Fig. 9 a simple rivet 13 is shown for securing the band to the vertical member. This rivet may be one of the rivets which secures the ends of the band together.

Another feature of the invention consists in means for holding the vertical reinforcing members a proper distance away from the casing 14, so that said members will be uniformly distributed and entirely embedded in the concrete. The means for so holding these vertical members consists of projecting portions 15 on the vertical members themselves, which contact with the casing. These projecting portions preferably will be portions punched out of the reinforcing members and bent at an angle thereto to contact with the casing.

The metallic members of the column will be built up in the manner described and then inclosed in the casing and the concrete and cement filled into the same, thus entirely enveloping and embedding the metallic members. The bands 6 envelop the major portion of the body of the concrete, thus holding the same against lateral fracture, and consequently enabling the same to carry very heavy loads. The vertical reinforcing members act as tension members to resist flexing of the column. These vertical members have the major portion of their metal removed the greatest possible distance from the center of the column, thus greatly increasing the radius of gyration and giving the maximum stability to the column for the amount of metal in the vertical members. The bands are connected to the vertical members in such a manner that they will be held absolutely in place even though the workmen should use the bands as a ladder to climb up and down, as they frequently do in constructing the columns. Said bands in the completed column will be in a true horizontal position, thus giving them the maximum efficiency. The entire metallic structure will be uniformly distributed in the concrete by reason of the projecting portions 15, which contact with the casing. The resultant column possesses a very high degree of strength.

What I claim is—

1. A column or the like, comprising a series of metallic members extending vertically of the column, a series of metallic bands running transversely thereof and enveloping the main body of concrete, projections on said vertical members for holding the bands fixedly in place transversely to the axis of the column, and concrete or the like enveloping and embedding said bands and vertical members.

2. A column or the like, comprising a series of metallic members extending vertically of the column, a series of metallic bands running transversely thereof and enveloping the main body of concrete, said vertical members having projecting portions engaging the bands and holding the same fixedly in place transversely to the axis of the column, and concrete or the like enveloping and embedding said bands.

3. A column or the like, comprising a series of metallic members extending vertically of the column, a series of bands running transversely thereof and enveloping the main body of concrete, said vertical members having openings punched in their bodies, means projecting through said openings engaging said bands and holding the same fixedly in place transversely to the axis of the column, and concrete or the like enveloping and embedding said bands.

4. A column or the like, comprising a series of metallic members extending vertically of the column, a series of metallic bands running transversely thereof and enveloping the main body of concrete, staples having their ends projecting through openings in said ver-

tical members, said staples engaging said bands and holding the same fixedly in place transversely to the axis of the column, and concrete or the like enveloping and embedding said bands and vertical members.

5. A column or the like, comprising a series of metallic members extending vertically of the column, a series of metallic bands running transversely thereof and enveloping the main body of concrete, staples having their ends projecting through openings in said vertical members and bent over the front face of said bands and holding the same fixedly in place transversely to the axis of the column, and concrete or the like enveloping and embedding said bands and vertical members.

6. A column or the like comprising a series of metallic members extending longitudinally of the column, said members being provided with broad thin webs and arranged with said webs toward the outer face of the column, a series of bands connected to said vertical members and extending transversely of the column and enveloping the main body of concrete, and concrete or the like enveloping and embedding said metallic members.

7. A column or the like, comprising a series of matallic members extending longitudinally of the column, said members being provided with broad webs arranged toward the outer face of the column and with an inwardly-projecting flange or flanges, a series of metallic bands extending transversely of the column and connected to said vertical members and enveloping the main body of concrete, and concrete or the like enveloping and embedding said metallic members.

8. A column or the like, comprising a series of metallic members extending longitudinally of the column, said members having the major portion of the metal on the sides facing the outer surface of the column and being provided with projecting portions for contacting with the casing, and concrete or the like enveloping and embedding said metallic members.

9. A column or the like, comprising a series of vertical metallic members provided with projecting portions for contacting with the casing, a series of bands extending transversely of the column and engaging said vertical members, and concrete or the like enveloping and embedding said metallic members.

10. A column or the like, comprising a series of metallic members extending longitudinally of the column and having portions thereof punched out and bent at an angle to contact with the casing, and concrete or the like enveloping and embedding said metallic members.

11. A column or the like, comprising a series of metallic members extending longitudinally of the column and having portions of their bodies punched out and bent at an angle to contact with the casing, a series of bands extending transversely of the columns and engaging said longitudinal members, and concrete or the like enveloping and embedding said metallic members.

In testimony whereof I, the said ROBERT A. CUMMINGS, have hereunto set my hand.

ROBERT A. CUMMINGS.

Witnesses:
F. W. WINTER,
ROBERT C. TOTTEN.

No. 857,821. PATENTED JUNE 25, 1907.

E. McCLURE.

BUILDING CONSTRUCTION.

APPLICATION FILED DEC. 17, 1906.

Fig. 1.

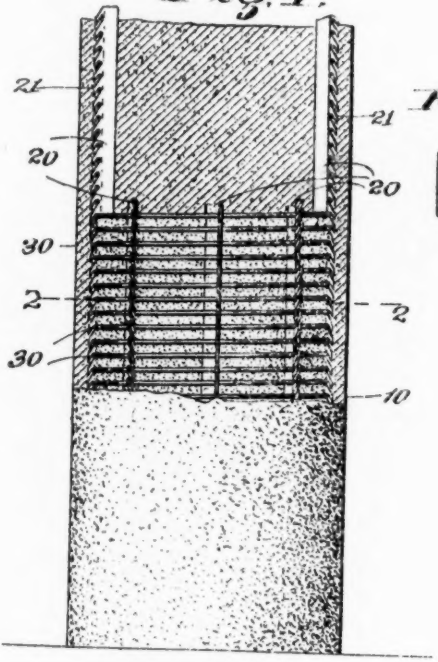


Fig. 4.

Fig. 3.

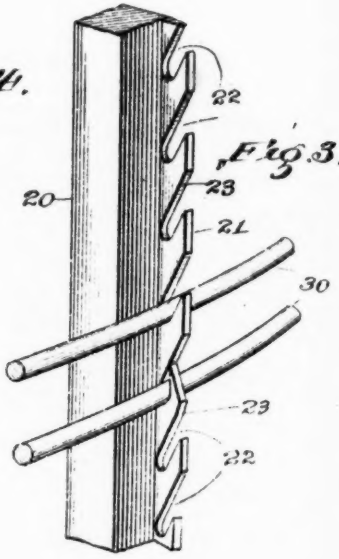


Fig. 5.

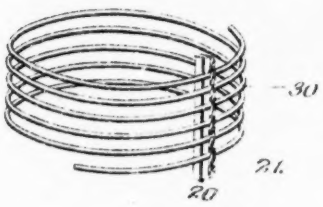


Fig. 2.

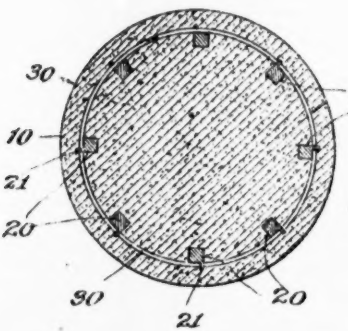


Fig. 8.

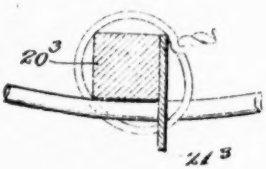
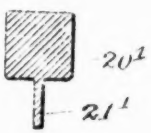


Fig. 6.



Witnesses:
Wm. P. Bond
Laura L. Russell

Fig. 7.

Inventor:
Edward McClure,
by Charles C. Shurtleff
his Atty.

UNITED STATES PATENT OFFICE.

EDWARD McCLURE, OF CHICAGO, ILLINOIS, ASSIGNOR OF ONE-HALF TO FRANKLIN P. SMITH, OF CHICAGO, ILLINOIS.

BUILDING CONSTRUCTION.

No. 857,821. Specification of Letters Patent. Patented June 25, 1907.

Application filed December 17, 1906. Serial No. 348,119.

To all whom it may concern:

Be it known that I, EDWARD McCLURE, a citizen of the United States, a resident of Chicago, in the county of Cook and State of Illinois, have invented certain new and useful Improvements in Building Construction, of which the following is a full, clear, and exact description.

My invention relates to certain new and useful improvements in building construction and more particularly to improvements in the columns which form the upright supporting members, of the building.

The object of the invention is to simplify constructions of this class, to increase the strength thereof, to provide a rigid and practically inflexible binder for the concrete and to otherwise improve the same.

To such end the invention relates to certain novel features of construction and arrangement, a description of which will be found in the following specification and the essential features of which will be more definitely pointed out in the appended claims.

The invention is clearly illustrated in the accompanying drawing in which

Figure 1 is a view partly in side elevation and partly in section illustrating the preferred form of my invention. Fig. 2 is a horizontal section taken in the line 2—2 Fig. 1. Fig. 3 is a fragmental perspective view of one of the upright members, and binder wire that form the main frame or skeleton of the column. Fig. 4 is a horizontal cross section through one of the uprights. Fig. 5 is a perspective view of a fragment of the binder wire and one upright, and Figs. 6, 7 and 8 are horizontal cross sections of modified forms of uprights.

In Figs 1 to 5, inclusive, 10 represents a column constructed in accordance with the preferred form of my invention. As shown the frame work of the column contains a number of circumferentially disposed bars or uprights 20, of any suitable cross section, preferably of rolled steel bars. The size of the bars, that is to say the area of their cross section, and their number depend upon the size of the column and the load to be carried, and the ones shown in Figs. 3 and 4 are approximately half size and suitable for a column of say, from 18 to 30 inches. These bars are connected by a coil of wire 30, which is wound around the bars and suitably spaced apart and connected thereto by a serrated or toothed fin or web 21, which extends out from the main part of the bar or rod as clearly shown in Figs. 3 and 4. This fin or web 21, is quite thin as compared with the main body of the bar or rod 20, and the notches or spaces 22, between the teeth 23 preferably extend at an acute angle with respect to the bar or rod. The alternate bars or rods 20, are upended or reversed, to make the teeth and notches extend downward and in a direction opposite to that in which the notches in the other bars extend, the effect being to secure the wire to the bars or rods without any further fastening medium. In practice, however, it is found desirable to clench the ends of some of the teeth down upon the wire and this is done with every fifth or sixth tooth. By thus clenching a few of the teeth the wires and uprights are tied together and no twisting is possible of the frame thus formed. In constructing columns of this class it is important that the main body of the uprights should not be weakened in any manner, inasmuch as its strength will thereby be greatly impaired. Various attempts have been made to space the wires upon the uprights and to tie them thereto, as for instance, they have been wired thereto, but with a construction of this kind the frame when complete, may be twisted around and it is practically impossible to make a perfectly rigid frame, which is obviously necessary in a device of this class. For very light work, thin, notched strips have been used but this is impractical for heavy work, and if rods of large diameter are used with notches and teeth extending the full width of their faces, a great waste of material is occasioned and the bar is weakened by punching out the slots between the teeth. Furthermore the clenching down of teeth of this size becomes a difficult matter requiring extra labor and time. By constructing the rod or bar of the proper cross section to be the most effective for the purpose intended, and providing it with a serrated fin or web for the attachment of the wire, all of the undesirable and impracticable features are avoided and means are provided whereby the rods and wire may be firmly united to make a more rigid frame work, with less amount of metal, and labor in its construction. To complete the column the frame thus formed is filled with concrete 30

and the outer surface covered with two or three inches of concrete, thus completely embedding the frame in the concrete. The concrete surrounds the bars on all of their sides and fills in between the teeth of the fins and between the turns of the coil of wire, so that the frame and concrete are firmly united. A column thus constructed has practically the same carrying capacity as the ordinary steel column occupying the same amount of area in cross section and is less destructible in fire than the unprotected steel columns.

In Fig. 6 the fin or web 21^1 is shown as placed in the center of one of the sides of the bar 20^1, and in Fig. 7 the bar 20^2 is oblong in cross section with the fin or web 21^2 extending out from one of its corners. In Fig. 8 the fin or web is shown as composed of a separate strip of metal 21^3 wired to the main bar 20^3. Other alterations and modifications of the device are possible and I do not therefore desire to limit myself to the specific forms shown and described except as particularly pointed out in the appended claims.

I claim as new and desire to secure by Letters Patent.

1. In a concrete column construction, the combination of one or more upright bars or rods and a spiral encircling band extending throughout the entire length of the column, each bar or rod having a thin toothed longitudinally extending web adapted to form a connecting medium between the encircling band and the bars or rods.

2. In a concrete column construction, the combination of a plurality of circumferentially disposed upright bars or rods, each having a thin toothed longitudinally extending fin or web, a spiral coil of wire wound upon the bars and extending throughout the entire length of the column, each turn of the wire being seated in the notches between the teeth of the fins, and a body of concrete in which the bars and wire are wholly embedded.

3. In a concrete column construction, the combination with a metal frame work, comprising upright bars or rods having thin longitudinally extending fins or webs that contain diagonally extending notches, and a spiral coil of wire wound upon said bars and extending throughout the entire length of the column, each turn of said wire resting in a notch in the fins or webs, of a body of concrete in which the frame work is wholly embedded.

4. In a concrete column construction, the combination of a plurality of upright bars or rods, each having a thin longitudinally extending toothed fin or web, the teeth extending diagonally with respect to the bar, and the teeth on the alternate bars extending upward, and on the others extending downward, a spiral coil of wire wound around the bars or rods and extending throughout the entire length of the column and seated in the spaces between the teeth, and a body of concrete in which the bars and wire are wholly embedded.

5. In a concrete column construction, the combination of a plurality of bars or rods, each having a longitudinally extending toothed web, a spiral coil of wire wound around the bars or rods and extending throughout the entire length of the column and seated in the spaces between the teeth, certain of which are clenched down upon the wire, and a body of concrete in which the bars and wire are wholly embedded.

In witness whereof I have executed the above application for Letters Patent of the United States, at Chicago, county of Cook and State of Illinois, this twelfth day of December, 1906.

EDWARD McCLURE.

Witnesses:
R. R. BARNITT,
A. FRISBIE.

No. 859,312. PATENTED JULY 9. 1907.

D. MAXWELL.

REINFORCE FOR CONCRETE.

APPLICATION FILED APR. 6, 1906.

Fig. 1.

Fig. 2.

Fig. 3.

Fig. 4.

Fig. 5.

Fig. 6.

Fig. 7.

WITNESSES

Warren W. Swartz

P. A. Baldwin Jr.

INVENTOR

David Maxwell

by Cushman & Symes

his attys

UNITED STATES PATENT OFFICE.

DAVID MAXWELL, OF DETROIT, MICHIGAN.

REINFORCE FOR CONCRETE.

No. 859,312. Specification of Letters Patent. Patented July 9, 1907.

Application filed April 6, 1906. Serial No. 310,260.

To all whom it may concern:

Be it known that I, DAVID MAXWELL, of Detroit, Wayne county, Michigan, have invented a new and useful Reinforce for Concrete, of which the following is a full, clear, and exact description, reference being had to the accompanying drawings, forming part of this specification, in which—

Figure 1 is a side elevation of my improved reinforce; Fig. 2 is a plan view of the blank from which it is formed; Figs. 3 and 4 are cross sections on the line III—III and IV—IV respectively of Figs. 1 and 2; and Figs. 5, 6 and 7 are detail views of modified forms.

My invention relates to the reinforcing of concrete beams and structures.

The object of the invention is to provide a reinforce in which the bottom chord is increased in cross-sectional area from each end toward the center, and provide for cutting a truss or reinforce from a single plate or shape having the chord of increasing strength and braces extending upwardly.

In the form shown, I take a blank 2, which is preferably provided along one edge with a thickened portion 3. This blank is cut into stepped shape shown in Fig. 2, and from each step the metal is slitted inwardly on the line *a—a*. The central portion of the blank is then crimped in opposite directions, which may be done by passing it through fluted or corrugated rolls or in a press. The layers are then compressed together, as shown in cross-section in Fig. 3, and the cut brace members are bent outwardly and upwardly from each side portion. These braces 4 pass above the neutral axis of the girder into the compression portion of the concrete beam or slab to which the stresses are transferred as in a bridge. In the form shown, I have indicated in dotted lines a channel 5 having its web cut to form cross bars 6, over which the upper ends of the braces are bent or hooked, as shown. In this case the channel or shape will form a part of the compression member of the beam and bind the mass together.

In Fig. 5 I show the end portion of a form similar to that of Fig. 1, except that the end of the lowest portion of the chord is left horizontal. The extreme end may be turned up slightly, as shown.

In Fig. 6 I show an end view of another form of blank wherein the reinforcing side or edge portion is of a different form.

In Fig. 7 I show a form where the web portion gradually tapers in thickness from one side toward the other. This is especially desirable where it is desired to thicken the diagonals near the ends where they receive the greatest shearing stress, they being thinner toward the center where this stress approaches zero. The diagonals may also be made closer together as they approach the ends of the reinforce to more fully resist the shearing stress. The original plate or shape may be rectangular in form instead of having the step form shown in Fig. 2. This will leave a surplus of material which may be bent towards the center parallel with the bottom chord at the intended height of the diagonal; or bent to form reinforcements for the diagonals themselves.

The reinforce or truss is embedded in the concrete beam in the ordinary manner, and the bottom chord increases in section toward the center of the beam in accordance with the principles of bridge trussing. The construction of my truss allows the diagonals being spaced along the bottom chord at distances proportional to the increase in shearing stress; that is, the diagonals are preferably placed closer together at the ends than toward the center.

The advantages of my invention result from the simplicity and cheapness of the reinforce, and from the strength of the concrete beam in which it is embedded. The blank may consist of a plate or a rolled shape. The cuts which form the braces can be made either before or after crimping. The metallic top chord member may or may not be used as desired, and other variations may be made in the form and arrangement of the parts without departing from my invention.

I claim:—

1. A metal reinforce for concrete structures, consisting of a single plate or shape cut into stepped form and increasing in cross-section from each end toward the center, the end portions of at least some of the steps being bent upwardly to form braces; substantially as described.

2. A metal reinforce for concrete structures, having a bottom chord formed from a single piece cut away at its end portions to increase its cross-section from each end toward the center, and having integral portions which are bent upwardly therefrom to form oblique braces; substantially as described.

3. A concrete reinforce having a longitudinally folded lower chord increasing in section toward the center, and braces projecting upwardly therefrom said chord and braces being formed from a single integral shape; substantially as described.

4. A concrete reinforce having a longitudinally folded bottom chord increasing in cross-section from the ends toward the center and having stepped portions cut and bent upwardly and outwardly into braces; substantially as described.

5. A metal reinforce for concrete structures, having a lower chord formed from a single shape of increasing cross-section from the ends towards the center, and slitted longitudinally to form portions which are bent upwardly to constitute braces; substantially as described.

6. A metal reinforce for concrete structures, having a lower chord formed from a single shape of increasing cross-section from the ends towards the center, and slitted longitudinally to form portions which are bent upwardly to constitute braces, said braces extending above the neutral axis of the structure; substantially as described.

7. A metal reinforce for concrete structures, consisting of an integral plate or shape of stepped form, with a

cut or slit extending from each step longitudinally toward the center of the plate or shape, and the cut or slitted portions bent upwardly to form oppositely inclined diagonals or braces; substantially as described.

8. A metal reinforce for concrete structures, having an integral plate or shape whose web is formed with a series of straight parallel longitudinal slits in different planes, said slits all extending from the ends inwardly toward the central portion of the shape, the slitted portions being bent upwardly to form brace members; substantially as described.

9. A metal reinforce for concrete structures, having an integral plate or shape whose web is thinner at one side than at the other and is of increasing cross-section from the ends toward the center, and formed with a series of parallel longitudinal slits in different vertical planes, the slited portions being bent upwardly to form bracing members; substantially as described.

10. A metal reinforce for concrete structures, comprising an integral plate or shape formed with a series of parallel longitudinal slits in different vertical planes, the slitted portions being bent upwardly to form diagonals or bracing members, and the web of the plate or shape having thickened portions which cause the diagonals or bracing members near the ends of the reinforce to be heavier than those near its center; substantially as described.

11. A metal reinforce for concrete structures, consisting of an integral plate or shape having stepped end portions formed with longitudinal parallel slits, the slitted step portions being bent upwardly to form a series of oblique braces; substantially as described.

12. A metal reinforce for concrete structures, having a bottom chord consisting of a shape folded longitudinally upon itself, and having a plurality of slits extending from each end portion towards the center, some at least of the slitted portion being bent upwardly to form braces; substantially as described.

In testimony whereof, I have hereunto set my hand.

DAVID MAXWELL.

Witnesses:
CHARLES F. DELBRIDGE,
ARTHUR D. STANSELL.

No. 868,065. PATENTED OCT. 15, 1907.

J. S. BARNES.

CONCRETE REINFORCEMENT.

APPLICATION FILED JUNE 28, 1906.

2 SHEETS—SHEET 1

Fig. 1.

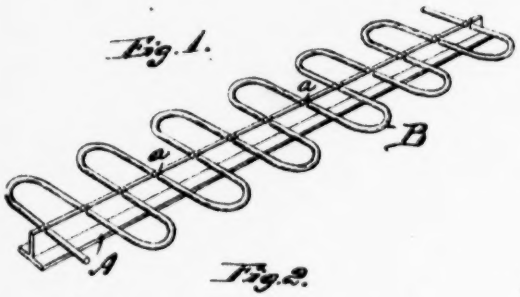


Fig. 6.

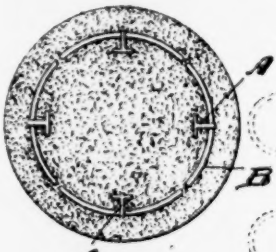


Fig. 2.

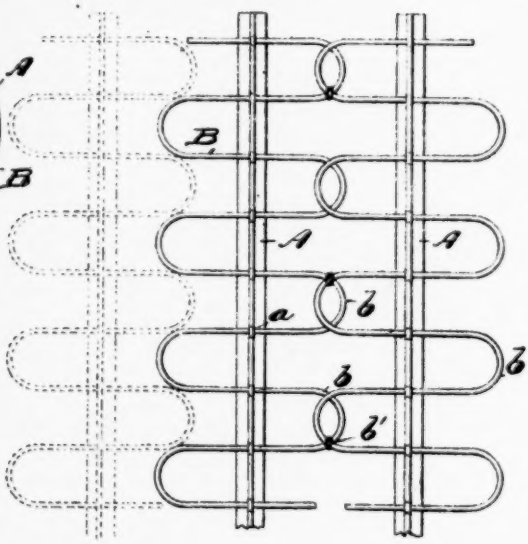


Fig. 5.

Fig. 7.

Fig. 3.

Fig. 4.

WITNESSES:

Oliver E. Barthel

Henry F. Villeroy

INVENTOR

John S. Barnes

BY J. E. Thomas

Attorney

No. 868,065. PATENTED OCT. 15, 1907.

J. S. BARNES.

CONCRETE REINFORCEMENT.

APPLICATION FILED JUNE 28, 1906.

2 SHEETS—SHEET 2.

Fig. 8.

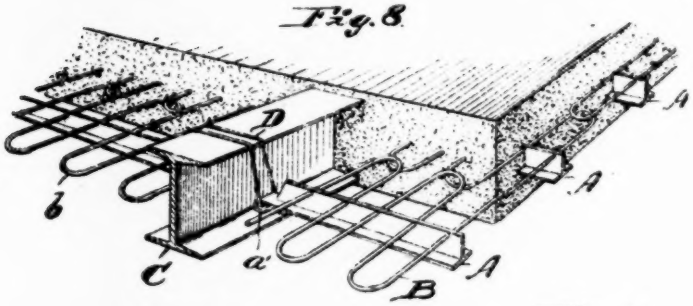


Fig. 9.

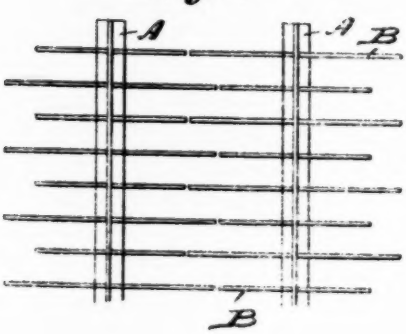


Fig. 10.

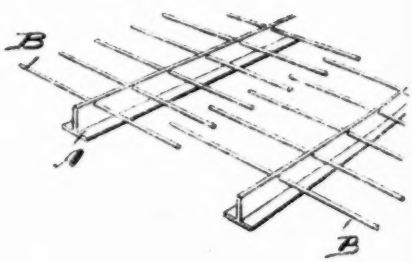


Fig. 13.

Fig. 11.

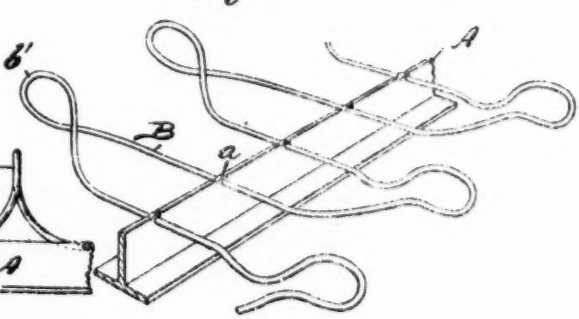
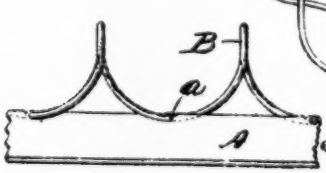


Fig. 12.



WITNESSES:

Oliver E. Barthel

Henry F. Villerot

INVENTOR

John S. Barnes

BY S. E. Thomas

Attorney

UNITED STATES PATENT OFFICE.

JOHN S. BARNES, OF DETROIT, MICHIGAN.

CONCRETE REINFORCEMENT.

No. 868,065. Specification of Letters Patent. Patented Oct. 15, 1907

Application filed June 28, 1906. Serial No. 323,827.

To all whom it may concern:

Be it known that I, JOHN S. BARNES, a citizen of the United States, residing at Detroit, county of Wayne, State of Michigan, have invented a certain new and useful Improvement in Concrete Reinforcements, and declare the following to be a full, clear, and exact description of the same, such as will enable others skilled in the art to which it pertains to make and use the same, reference being had to the accompanying drawings, which form a part of this specification.

My invention relates to an improvement in means for reinforcing concrete used in the construction of beams, floors, columns, etc., for buildings, or other structures, shown in the accompanying drawings and more particularly set forth in the following specification and claims.

In the drawings: Figure 1 is a perspective view of the reinforcing member. Fig. 2 is a plan view showing two or more of the members in adjacent relation. Fig. 3 is a sectional view through a floor or ceiling showing the reinforcement embedded in the concrete and in turn supported by the usual I-beams. Fig. 4 is a detail showing the manner of securing the binding rod or wire in the web of the T-bar. Fig. 5 is a variation showing the T-bar crimped to increase its bearing surface in the concrete. Fig. 6 is a cross-sectional view through a column showing the binding wires formed on the arc of a circle, to adapt them for purposes of this and like constructions. Fig. 7 is a perspective view of the reinforcement employed in Fig. 6. Fig. 8 is a perspective view showing a portion of the concrete floor and ceiling broken away to expose the reinforcing members and the manner of engaging the latter with the I-beams. Fig. 9 is a modification of the form of the binding wires employed in the reinforcing member. Fig. 10 is another modification of the same. Fig. 11 shows the ends of the binding wire bent upward in the form of a loop to increase its cross-sectional reinforcing area. Fig. 12 is an elevation of the reinforcing member shown in Fig. 11 looking toward the ends of the binding wire. Fig. 13 shows a modification in the form of the T-bar for supporting the binding wire.

The object of my invention is to construct a reinforcement which shall be inexpensive to manufacture and readily adapted for use in different forms of concrete construction. Other advantages will hereafter appear.

Referring to the letters of reference shown in the drawings, A is an ordinary T-bar, though other forms of commercial iron may be employed if desired. At suitable intervals throughout its length, depressions *a*,—or perforations, if desired,—are made in the web of the bar to receive the binding wire B, arranged to project in opposite directions from the web of the bar. When the T-bars are assembled in adjacent relation, the return bends *b* of the binding wire may overlap, as shown in Fig. 2, and if desired, locked together by tie wires *b'*,—or, as indicated in dotted lines in the same figure, the return bends may project into the open end of the loop of the opposite binding wire and, if desired, be locked together where the wires abut.

As shown in Figs. 3 and 8 of the drawings, the T-bars are linked together over the I-beams C, as indicated at D, the T-bars being perforated at their ends, or provided with a return bend *a'*, as indicated in the views referred to. When used in reinforcing concrete columns or other like structures, the binding wires B are formed on an arc of a circle, as shown in Figs. 6 and 7 of the drawings, to more particularly adapt them to the necessities of this construction.

By crimping the T-bar supporting the binding wires, I greatly increase the binding surface exposed to the concrete and thereby add to its efficiency.

While I have shown the web of the T-bars cut with a U-shaped opening to receive the binding wires, the construction is such that the edges of the web are closed over the binding wire to secure it in the T. In place of the depressions in the T-bar the web may be perforated to receive the wire, being afterwards swaged to secure it in the web of the bar. I prefer, however, the construction shown as it is more simple, and cheaper to manufacture.

In the modification shown in Fig. 9, the binding wire is made of short sections, each alternate wire being longer than that on either side in order that the adjacent T-bar with its series of binding wires may interlock in order to afford an unbroken reinforcement when embedded in the concrete.

In the form shown in Fig. 10, the binding wires are of equal length, but when the reinforcing members are placed in adjacent relation they are placed so that the binding wires will interlock in order to present an unbroken surface. It will be seen that in the use of either of the forms shown in Fig. 9 or 10 that considerable wire will be saved, as the wire necessary to form the loop in the other figures will be dispensed with.

In the modification shown in Figs. 11 and 12, the loops at the end of the binding wire are turned at right angles in order to widen the reinforcing area.

It will be seen that by the employment of my invention the entire concrete area is knit together, it being impossible for a crack to extend in a direction not covered by reinforcing wire.

Having thus described my invention, what I claim is:—

1. A reinforcement for concrete construction consisting of a supporting bar including a base and also a web portion, the web portion having a series of pairs of fingers along its upper edge, said fingers being bendable in the longitudinal plane of the web, and a continuous binding

wire secured at intervals to the web between said pairs of fingers, the wire projecting upon opposite sides of the web beyond the outer opposite edges of the base portion of the bar.

2. A reinforcement for concrete construction consisting of supporting bars each including a base and also a web portion having a series of pairs of fingers along its upper edge, the bars being arranged in parallelism and the fingers of each web being bendable in the longitudinal plane of the web, a continuous binding wire secured to the web of each bar between the corresponding fingers, each wire projecting upon opposite sides of the web beyond the outer opposite longitudinal edges of the base of the corresponding bar, the wire of one bar overlapping the wire of the other bar, and means for connecting the overlapping portions of the wires together.

3. A reinforcement for concrete construction consisting of a beam including a base, supporting bars arranged in alinement upon opposite sides of the beam with the inner ends of the bars resting upon the base, the ends of the bars adjacent the beam having eyes therein, means passed through the eyes of the bars and bridging the beam to secure the beam and bars together, and binding wires secured to each bar, the binding wires of adjacent bars upon each side of the beam overlapping it at intervals, and means for connecting the overlapping parts of the binding wires together.

4. A reinforcement for concrete construction consisting of a beam including a base, supporting bars arranged in alinement upon opposite sides of the beam with the inner ends of the bars resting upon the base, the ends of the bars adjacent the beam having eyes therein, means passed through the eyes of the bars and bridging the beam to secure the beam and bars together, each bar including a base and also a web portion having a series of fingers in its upper edge bendable longitudinally of the web, and a continuous binding wire secured to the web of each bar between the corresponding fingers, each wire projecting upon opposite sides of the web beyond the outer opposite longitudinal edges of the corresponding bar, the wire of one bar overlapping at intervals the wire of the adjacent bar upon corresponding sides of said beam, and means for connecting the overlapping parts of the wires together.

In testimony whereof, I sign this specification in the presence of two witnesses.

JOHN S. BARNES.

Witnesses:
S. E. THOMAS,
HENRY E. VILLERAT

A.D. 1874, 14th *Mar.* N° 1715.

Constructing Buildings, &c.

LETTERS PATENT to Thaddeus Hyatt, of Gloucester Gardens, Hyde Park, in the County of Middlesex, Manufacturer of Patent Lights, for the Invention of "**Improvements in Constructing, Lighting, Ventilating, and Fireproofing Buildings, Partly applicable to Building Materials and Appliances, and to Ships.**"

Sealed the 24th July 1874, and dated the 14th May 1874.

PROVISIONAL SPECIFICATION left by the said Thaddeus Hyatt at the Office of the Commissioners of Patents, with his Petition, on the 14th May 1874.

I, **Thaddeus Hyatt**, of Gloucester Gardens, Hyde Park, in the County of Middlesex, Manufacturer of Patent Lights, do hereby declare the nature of the said Invention for "**Improvements in Constructing, Lighting, Ventilating, and Fireproofing Buildings, Partly applicable to Building Materials and Appliances, and to Ships.**" to be as follows:—

The erection of combustible buildings being partly if not mainly attributable to the ease and cheapness of obtaining materials for such constructions and the difficulty of obtaining cheap and reliable fire-

suitable shaping dies or otherwise manipulated until made to represent the forms of ordinary solid beams, such as the web and flange, the U shape, or other forms, as shewn by Figure 3.

a, *a*, Figures 1, 2, and 3, represent the interlaced metal and *b*, *b*, the concrete or other equivalent material. Figure 2 represents a beam made of two shells or skeletons of interlaced material, an outer one *a*, *a*, and an inner one a^1, a^1, both imbedded in the concrete *b*, *b*. This beam as represented in Figure 2, is hollow but may be solid if preferred. The tie *c* may be rivetted or otherwise attached to the metal skeleton, as shewn, and is preferably placed well up in the concrete to be out of the way of flame in case of being attacked by fire.

Figures 4 and 5 represent the metal skeleton *a*, *a*, in the form of a spiral made of flat metal ribbon, the tie-rod C being attached to the bottom thereof on the inside as shewn, *b*, *b*, being the concrete plastic or cement. This spiral coil may, if desired, have wire netting added to it, or longitudinal strips of metal somewhat similar in shape to the tie placed along its sides and top, and fastened thereto as an additional hold to the concrete.

According to another part of my Invention I make the metal skeleton of sheet metal by first cutting it with slits *d*, *d*, Figure 6, Sheet 2; *e*, *e*, being the uncut parts of the sheet. I then pull out *e*, *e*, in opposite directions from each side of the sheet and thereby obtain tubular forms, as shewn by Figures 7, 8, 9, and 10; *e*, *e*, being the metal; *f*, *f*, Figure 8, being the concrete; and *c*, *c*, being the tie-rod.

According to another part of my Invention I make tubular beams of solid sheet metal and tie rods, employing in some cases metal sufficiently heavy to form a material portion of the strength of the beam, and in others to merely serve the purpose of the skeleton beams above described, viz., to unite the tie to the earthy or stony portion of the beam. Figures 11 and 12 represent this form, each being made, as here shewn, of two cylindrical metal shells or tubes, an outer one *a*, *a*, and an inner one a^1, a^1; *c*, *c*, being the tie rod, and *f*, *f*, the concrete. The cylinders are concentric in Figure 11, but excentric to one another in Figure 12.

According to another part of my Invention I make floors, roofs, and other constructions of metal beams arranged to be readily connected together laterally with tubes placed between them which

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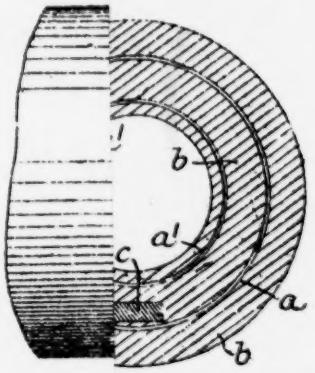
(4 SHEETS)
SHEET 1

FIG. 2.



A.D. 1874. MAY 14. No. 1715.
HYATT'S SPECIFICATION.
[2nd Edition.]

[4 SHEETS; SHEET 1.

FIG. 1.

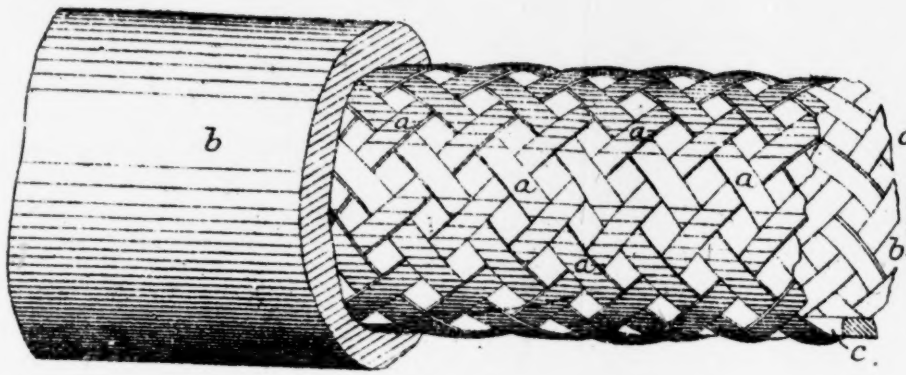


FIG. 2.

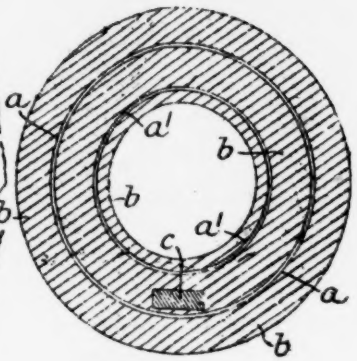


FIG. 3.

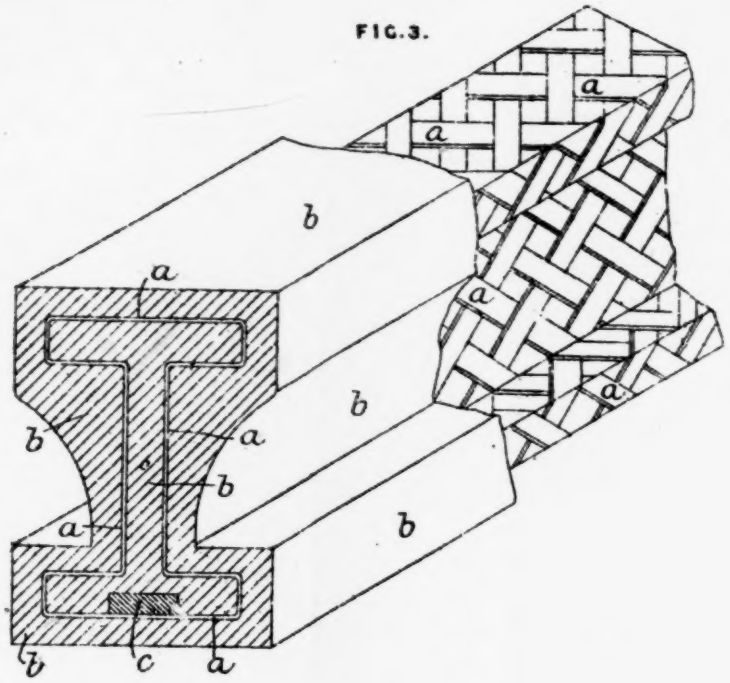


FIG. 4.

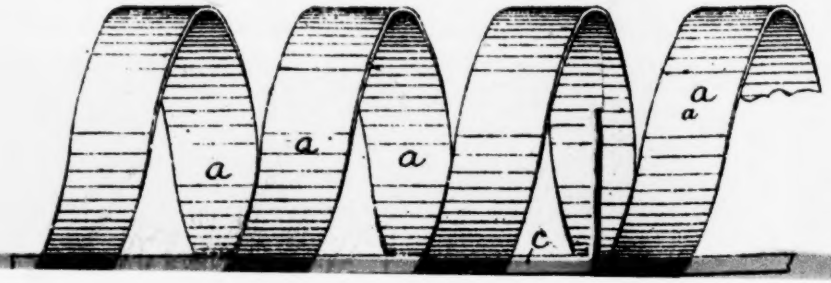
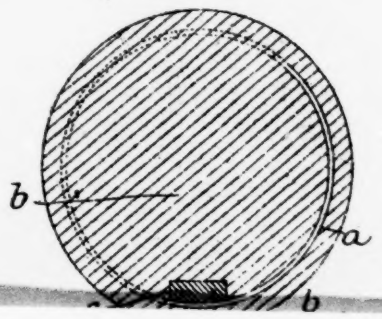


FIG. 5.



KAISERLICHES PATENTAMT.

AUSGEGEBEN DEN 11. JANUAR 1894

PATENTSCHRIFT

— № 73004 —

KLASSE 80: THON- UND STEINWAAREN-INDUSTRIE.

ROBERT KIESERLING IN HAMBURG UND MAX MÖLLER IN ALTONA.

Verfahren zur Herstellung von Cementhohlkörpern aus Stampfbeton mit stufenweise eingeformtem Eisengerippe.

Patentirt im Deutschen Reiche vom 24. März 1892 ab.

In manchen Fällen ist es zweckmäfsig, zur Erhöhung der Festigkeit von Cementhohlkörpern in die letzteren Eiseneinlagen einzuformen, welche von der Cementmischung vollständig umhüllt werden. Sobald aber diese Eiseneinlagen, die aus Drahtgeflecht, Drahtgewebe oder einer Reihe fest mit einander verbundener Stücke bestehen können, gleich als ein Ganzes aufgestellt werden, was bisher ausnahmslos geschah, werden die Vorzüge, welche das stufenweise Einformen des Cementhohlkörpers besitzt, sehr beschränkt, weil das Einstampfen der Cementmischung in die Form häufig fast unausführbar ist.

Um nun das Einstampfen der Cementmischung in die Form, den einzigen Weg, Hohlkörper von gröfster Festigkeit und Gleichmäfsigkeit im inneren Gefüge zu erzielen, beibehalten und doch gleichzeitig den derart erzeugten Hohlkörper mit einem Eisengerippe versehen zu können, ohne das Einstampfen zu behindern, soll das nachstehend beschriebene Verfahren dienen.

Dasselbe besteht im wesentlichen darin, dafs das Eisengerippe aus einzelnen Theilen zusammengesetzt wird, die nach und nach, entsprechend dem Fortgange der eigentlichen Formarbeit, in Verbindung mit einander gebracht werden.

Da nun im Allgemeinen aus praktischen Gründen die das Einstampfen bewirkenden Mittel in senkrechter Richtung bewegt werden, so ist nachstehend, obwohl es ja auch denkbar ist, dafs von der Seite eingestampft wird, angenommen worden, dafs das einstampfende Werkzeug in senkrechter Richtung auf- und abwärts bewegt wird. In dem Falle ist es angängig, die senkrecht oder annähernd senkrecht stehenden Theile des Eisengerippes sofort als Ganzes aufzustellen, oder aber auch dieselben aus einzelnen über einander liegenden Stücken nach und nach, dem Fortgange der Formarbeit entsprechend, zusammenzusetzen.

Dieses letztere Verfahren, welches für die Herstellung von Hohlkörpern der verschiedensten Form und Gröfse anwendbar ist, soll nunmehr an einem Beispiele erläutert werden. Im engen Anschlufs an das in der Patentschrift Nr. 73003 beschriebene Verfahren der Herstellung eines Cementrohres aus Stampfbeton soll nachstehend angenommen werden, dafs es sich wieder um die Herstellung eines Cementrohres, jedoch mit Eisengerippe, handelt.

Zur Herstellung desselben verfährt man folgendermafsen:

Nachdem in den über der Grundplatte und zwischen dem Kern und der untersten Ringschicht des Mantels bestehenden Hohlraum eine in ihrer Stärke nach der Gröfse des herzustellenden Rohres sich richtende Lage *a* der Cementmischung rings um den Kern einge-

stampft ist, wird auf diese Lage ein Ring *b* gelegt, der entweder aus einem Stück oder auch aus mehreren mit einander verbundenen oder auch unabhängig von einander bestehenden Theilen gebildet ist. Dieser Ring *b* bezw. diese einzelnen von einander unabhängigen Stücke werden mit senkrechten Stützen *c* versehen, die mit dem einen Ende unter den Ring geschoben und umgeschlagen werden, wie das in den Fig. 2 und 3 ersichtlich ist.

Die Verbindung der Stützen *c* mit dem Ring *b*, sowie die Form dieser Stücke ist natürlich mannigfacher Abänderungen fähig, ohne dafs darum der Zweck derselben verfehlt würde. Nachdem nun diese Stützen, welche wegen ihrer im Verhältnifs zur Dicke des Rohres äufserst mäfsigen Stärke das Einstampfen des Betons in keiner Weise hindern, sämmtlich aufgebracht sind, wird der noch freie Hohlraum zwischen dem Kern und der ersten Mantelschicht bis an den Rand der letzteren fest mit der Cementmischung ausgestampft und darauf auf die Betonoberfläche bezw. die Stützen *c* ein Ring b^1 aufgelegt, der entweder schon mit Stützen c^1 versehen ist oder jetzt erst solche durch Unterführen und Umschlagen der Enden derselben um den Ring erhält. Ehe nun die zweite Mantelschicht aufgebaut und der zwischen derselben und dem Kern bestehende Hohlraum mit der Cementmischung ausgefüllt wird, werden die aus dem eingestampften Beton herausstehenden Enden der Stützen *c* mit dem von denselben getragenen Ring b^1 in passender Weise, am einfachsten durch Umschlagen um denselben, verbunden. Darauf wird die zweite Mantelschicht aufgebaut und der von dieser Schicht einerseits, dem Kern und der Betonoberfläche der ersten Lage andererseits begrenzte Hohlraum durch Einstampfen der Cementmischung bis an den oberen Rand der Mantelschicht ausgefüllt. Nachdem dann ein neuer Ring b^2 aufgelegt und mit Stützen c^2 versehen ist, werden die Enden der Stützen c^1, wie das vorher bei den Stützen *c* und dem Ring *b* geschah, um den Ring b^2 gebogen und die dritte Mantelschicht aufgebaut.

In dieser Weise schreitet die Bildung des Rohres sowie das Einformen des Eisengerippes vor, ohne dafs durch das letztere das Einstampfen des Betons in irgend welcher Hinsicht erschwert wäre. Ist das Rohr ein muffenloses, dann wird der letzte Ring, der keine senkrechten Stützen mehr erhält, nicht in der Höhe der oberen Kante der letzten Mantelschicht gelegt, sondern einige Centimeter tiefer und in der alten Weise mit den unter demselben liegenden Stützen verbunden. Der über dem letzten Ring liegende freie Raum der Form wird darauf ausgestampft und so erreicht, dafs das Eisengerippe von der Cementmischung allseitig umgeben ist.

Handelt es sich dagegen um die Herstellung eines Rohres mit Muffe, dann wird in gleicher Weise verfahren, jedoch aufserdem noch in Höhe des oberen Randes jener Mantelschicht, welche etwa in der Mitte der Muffe abschliefst, eine Seitenstrebe *d* abgezweigt, welche eine oder auch bisweilen zwei Stützen *e* trägt, die mit Ringen *f* in Verbindung stehen. Der letzte dieser Ringe besitzt natürlich auch keine Stützen. Derselbe wird vielmehr nur von solchen getragen und steht wieder einige Centimeter unterhalb des oberen Randes der Muffe, so dafs also auch dieses Nebengerippe allseitig von dem Beton umgeben ist.

Von dem eben geschilderten Verfahren zwar etwas abweichend, mit demselben aber in dem oben dargelegten Princip übereinstimmend, sind die in der Zeichnung noch veranschaulichten Verfahren.

In den Fig. 5, 6 und 7 ist in Seitenansicht und Grundrifs ein Eisengerippe dargestellt, dessen senkrechte Stützen *g* aus einem oder auch mehreren mit einander verbundenen Stücken bestehen können. Diese Stützen sind je mit einer Reihe von Aussparungen versehen, in welche ein Draht *h* zu liegen kommt, welcher spiralförmig auf die Stützen, dem Fortgange der Formarbeit entsprechend, gewickelt wird. Die in 7b und 7c gegebenen Ausführungsformen empfehlen sich insofern, als bei Beanspruchung des Rohres auf Zug der Draht nach beiden Richtungen hin ein Widerlager findet, was bei der durch die Fig. 5 und 7a veranschaulichten Ausführungsform nicht der Fall ist. Das in den Fig. 8 bis 11 dargestellte Eisengerippe bedarf hinsichtlich seiner Herstellung keiner weiteren Erläuterung.

Das in der Patentschrift Nr. 73003 beschriebene Verfahren und das vorliegende gleichen sich insofern aufserordentlich, als dort Theile der Form so lange fortgelassen wurden, bis dieselben unbedingt benöthigt wurden; dasselbe geschieht hier mit den einzelnen Theilen des Eisengerippes. Die Vorzüge des Verfahrens liegen, abgesehen davon, dafs das nicht genug zu schätzende Stampfverfahren beibehalten werden kann, darin, dafs durch das Eisengerippe nicht allein die Festigkeit des Hohlgegenstandes wesentlich erhöht wird, sondern auch der Cement vor und während des Abbindens einen vorzüglichen Halt gewinnt, so dafs das Abbrechen des Mantels sowohl als des Kernes sowie das Fortschaffen des Rohres von der Grundplatte früher geschehen kann, als das bei Herstellung der Rohre nach dem in der erwähnten Patentschrift beschriebenen Verfahren der Fall ist.

PATENT-ANSPRUCH:

Bei dem im Patent Nr. 73003 beschriebenen Verfahren zur Herstellung von Cementhohlkörpern aus Stampfbeton ein stufenweise eingeformtes Eisengerippe, dessen Aufbau in der Weise erfolgt, dafs jene Theile desselben, welche parallel oder annähernd parallel zur Bewegungsrichtung des einstampfenden Werkzeuges liegen ganz aufgebaut oder allmälig vervollständigt werden, während die diese Theile durchkreuzenden Stücke des Eisengerippes entsprechend dem Fortgange der Formarbeit eingefügt werden, zum Zweck ungehinderten Einstampfens des Betons in die Form.

ROBERT KIESERLING IN HAMBURG UND MAX MÖLLER IN ALTONA.

1892

Verfahren zur Herstellung von Cementhohlkörpern aus Stampfbeton mit stufenweise eingeformtem Eisengerippe.

Fig. 1.

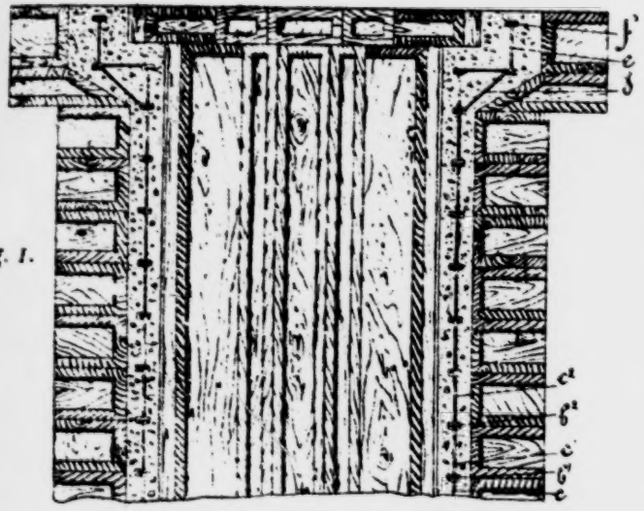
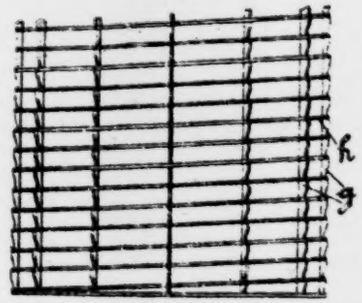


Fig. 5.



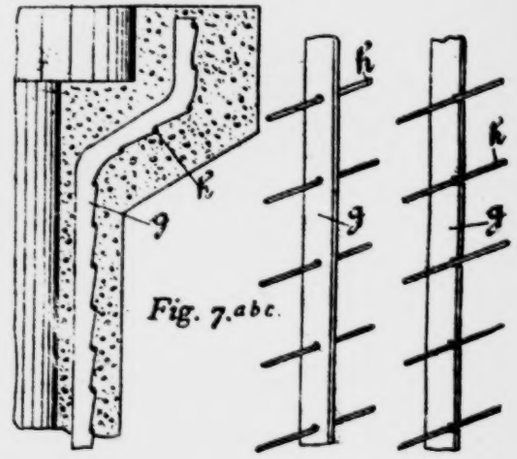


Fig. 7.abc.

Fig. 6.

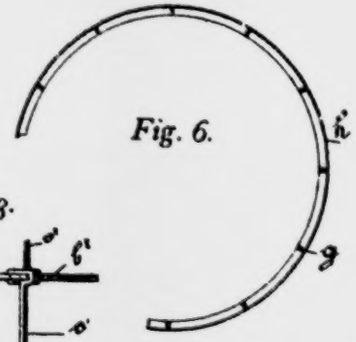


Fig. 8.

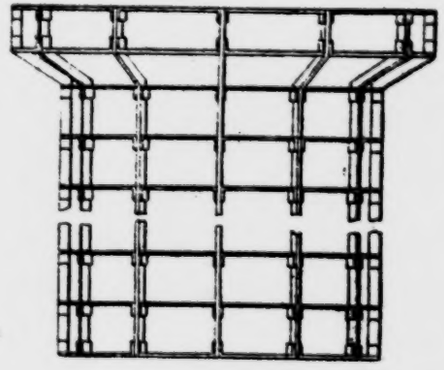


Fig. 3.

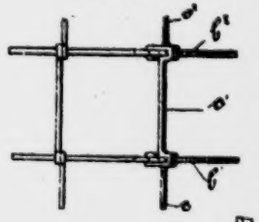


Fig. 2.

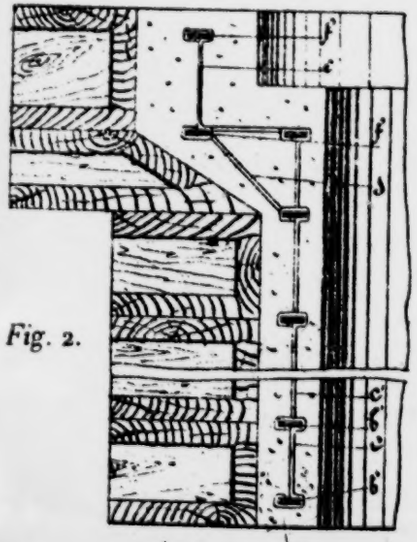


Fig. 10.

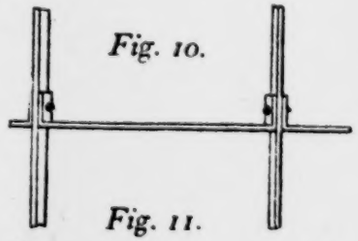


Fig. 4.

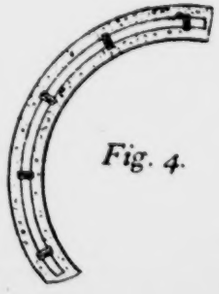


Fig. 11.

Fig. 9.

Zu der Patentschrift

№ 73004.

Translation of German Patent No. 73,004—Robert Kisserling of Hamburg and Max Moller of Altona.

THE PROCESS FOR THE PRODUCTION OF HOLLOW CONCRETE BODIES WITH PROGRESSIVELY FORMED STEEL REINFORCEMENT THEREIN.

In certain cases it is necessary, in order to increase the rigidity of hollow concrete bodies, to form therein steel reinforcing members which are substantially entirely surrounded by the mix- 326
ture of concrete. As soon, however, as these reinforcing members, which may consist of interwoven wire or of series of bars tied tightly to one another, are set up as a unit, which heretofore was the procedure without exception, the advantages which the progressive formation of the concrete hollow body possesses, are very much diminished, since the tamping of the concrete mixtures into the form is made practically impossible thereby.

Hereinafter is described the process in which is carried out the tamping of the concrete mixture into the form (the only way to attain hollow 327
concrete bodies of maximum solidity and uniformity in the inner layers thereof), and in which at the same time, the hollow body thus produced, is provided with steel reinforcement, without preventing the tamping of the concrete.

The process consists essentially therein that the steel reinforcement is built up of single parts which are gradually, according to the progress of the construction brought into connection with one another.

Since, for practical reasons, the means employed in tamping the concrete are actuated in a vertical direction. It will be assumed, therefore,

although it is also conceivable that the tamping may proceed horizontally, that the tamping apparatus is actuated reciprocally in a vertical direction. In such a case it is possible to set up at once in whole, the vertically or nearly vertically extending parts of the reinforcement, or it is possible also to gradually build up the latter of single parts superimposed vertically one over the other, according to the progress of the work.

This last procedure, which is applicable in the production of hollow bodies of the most varied
329 forms and magnitude is now to be disclosed in connection with a typical example. In the brief review of the process for producing a concrete pipe as described in the patent No. 73,003, it is to be hereinafter assumed that it is again a question of production of a concrete pipe, with, however, steel reinforcement therein.

For the production of the latter, the process is substantially as follows: After a layer a of concrete has been tamped about the core and immediately over a base plate and in a space between the core and the lowermost annular section of the mold, the thickness of which layer is
330 in proportion to the size of the pipe to be made there is laid upon this layer a ring b which consists of either one part or of several parts, either interconnected or even, also independent of one another. This ring b, or according to circumstances these individual and independent parts are provided with vertically extending studs c which at the one end thereof are placed under and bent around the ring as is illustrated in Figs. 2 and 3.

The connection between the studs c and the ring b, as well as the form of these parts, is en-

tirely susceptible to various possible embodiments without departing from the purposes thereof. After these several studs have been applied, which by reason of their substantially small cross-section in comparison to the thickness of the pipe itself do not prevent the tamping of the material in any manner whatsoever, the space between the core and the first section of the mold is filled with concrete up to the edge of the latter and the concrete tamped, and there is laid either upon the concrete surface or according to circumstances, upon the studs c, a 332
ring b_1, to which there are already applied studs c_1 or there are now applied such studs thereto by bending the ends thereof about the ring. Before, now, the second section of the mold is applied and the space between that and the core is filled with the concrete mixture, the studs c protruding through the tamped concrete are connected with the ring b_1 in a convenient manner, preferably by bending, which ring is carried by the studs c. Thereupon the second mold section is applied and the space between the latter, the core, and the concrete surface and the layer, is filled with concrete up to the upper 333
edge of the mold section and tamped. After a new ring b_2 has been applied provided with studs c_2, the ends of the studs c_1, as was the case with the studs c and the ring b I now bend about the ring b_2 and the third mold section thereby built up.

In this matter the formation of the pipe as well as the construction of the steel reinforcement proceeds, without, however, that the latter interferes with or makes difficult the tamping of the concrete in any manner whatsoever. If the pipe is to be without a coupling flange,

then the last ring, to which there are attached no upright studs, is not laid at a level corresponding with that of the edge of the last mold section, but is placed several centimeters lower and connected with the studs extending immediately thereunder in the manner heretofore described. The space immediately over the last ring is now filled and tamped with concrete so that the reinforcement is entirely surrounded on all sides by the concrete mixture.

If it is a question of constructing a pipe with
335 a coupling flange, then the process is carried out in the same manner, but there is branched off a side strut d at the height of the upper edge of that mold section which terminates about at the center of the coupling, which side strut has mounted thereon one or two studs e which are connected with the rings f the last of these rings has naturally no studs mounted thereupon. The latter is moreover carried by such studs and is several centimeters below the upper surface of the coupling flange, so that therefore this laterally extending reinforcement is completed surrounded by the mixture.

336 Departing from the above described process, but combining therein the above described principle, there are described in the drawings various further embodiments of this invention.

In Figs. 5, 6 and 7 there is illustrated, in side elevation and in cross-section, such a steel reinforcement, whose upright studs g may consist of one or more interconnected parts. These studs are provided with a series of notches which are adapted to receive a wire h, which is wound upon the studs spirally as the construction progresses.

In Figs. 7b and 7c, are shown advantageous embodiments, in which the wire h is connected

with the studs so as to be capable of resistance in both directions, which is not the case in the embodiments illustrated in Figs. 5 and 7a. The reinforcing structure shown in Figs. 8 to 11 requires, in view thereof, no further disclosure.

The processes described in the patent No. 73-003 and the processes herein disclosed, are extraordinarily similar insofar as in the former the sections of the mold are left off until they were absolutely necessary; the same is the case here with the single parts of the steel structure. The advantages of the processes aside 338
from the fact that the tamping, which cannot be given too much emphasis, can be retained, lie not only in the fact that the rigidity of the whole structure essentially is increased by reason of the reinforcement, but also in the fact that the cement both before and during the setting thereof attains an advantageous density so that the dissembling of the mold and the core as well as the removal of the pipe from the base plate itself, can take place much sooner than in the construction of pipes according to the processes described in the above mentioned patent.

CLAIM: 339

The processes for the production of hollow concrete bodies, as described in patent No. 73,-003 of "material adapted to be tamped" a steel reinforcement formed therein progressively, whose construction takes place in such a manner that such parts thereof, which lie parallel or nearly parallel to the direction of actuation of a tampering apparatus, are either built up or eventually completed, while the parts of the reinforcement extending through said first parts are inserted as the construction proceeds, for the purpose of allowing the free tamping of the material into the mold.

340

Stipulation

UNITED STATES DISTRICT COURT

SOUTHERN DISTRICT OF NEW YORK

GEORGE E. VANDENBURGH, Plaintiff, vs. CONCRETE STEEL COMPANY, Defendant.	In Equity. 14-88. Re-issued Letters Patent 14,182.

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It is hereby stipulated by and between the parties hereto that the annexed abstracts of defendant's Exhibits B and C may be used instead of said exhibits and reproduced in the record on appeal in lieu of said exhibits.

JAS. H. GRIFFIN,
Solicitor for Plaintiff.

FRANCIS E. MURRAY,
Solicitor for Defendant.

342 October 11th, 1918.

343

Abstract of Defendant's Exhibit B

File wrapper and contents of patent No. 841,741.

This patent was granted to George E. Vandenburgh January 22, 1907, on an application filed May 9, 1906, Serial No. 315,959.

The petition and oath are in the usual form.

The specification is exactly as it appears in the patent.

The claims as filed and corrected and cancelled are as appears on the next page. Substituted claims are as in patent.

344

Sub B Oct 30. '06 Sept 27-06

1. A reenforcing bar provided with a spirally disposed coil secured thereto.

" " "

2. A reenforcing bar provided with a spirally disposed coil secured thereto, and a secondary spirally disposed coil extending in the opposite direction to the first mentioned coil.

Oct 30, 06 Sept 27 '06

Cancelled Oct 30 '06

3. A reenforcing bar provided upon one edge with a series of kerfs and integral spurs, and a spiral coil disposed in said kerfs and retained by said spurs.

" " "

4. A reenforcing bar provided with a series of kerfs at opposite sides of the center thereof and disposed toward the ends of the bar, oppositely disposed coils seated in said kerfs, and spurs carried by the bar for retaining the coils in said kerfs.

Sept 27-06

5. A reenforcing bar provided at opposite sides of its center with spiral coils secured thereto and deflected in opposite directions from the center of the bar.

6. A reenforcing bar provided at opposite sides of its center with spiral coils secured thereto and deflected in opposite directions from the center of the bar, and a secondary spiral coil secured to the bar and extended in the opposite direction to the first mentioned coil throughout the length thereof.

September 25, 1906, the application was rejected by the Patent Office and the action read as follows:

"Claim 1 is rejected on the Swiss patent to:
Muuch, 19,271, C. & F., C. & M.

"Claim 2 is rejected on:
Mueser, 815 617, Mar. 20, 1906 M. R.

"Claim 3 is rejected on the Swiss patent above in view of:
Peabody, 805,663, Nov. 28, 1905, M. R. 350

"Claim 4 is rejected on Peabody.

"Claim 5 is rejected on the Swiss patent above.

"C. C. W. "W. A. Cowles
"Examiner Division 33."

Under date of September 27, 1906, the claims were amended as indicated on the preceding page and then the attorney submitted the following argument:

"The claims have been amended to clearly 351
distinguish over the Swiss patent cited which does not show the spirally coiled strand secured to the bar to prevent lateral movement thereon, and does not have the free coils disposed be-

352 *Abstract of Defendant's Exhibit B*

yond the bar to be embedded in the concrete and form an arch structure of practically the diameter of the coils. In the Swiss patent in Figure 1 a spiral coil is not shown, but the wire is coiled over two rods, as shown in Figure 1^a while in Figure 2 the wire is in an oval form as shown in Figure 2^a. In neither instance can the extended area of applicant's spiral be secured, and in the use of such a spiral it is necessary that it be secured to the bar to prevent lateral displacement when tamping the mater-
353 ial in position. The reference device shows a different form of brace where the wire simply extends between two parallel bars and is only practically of the width of these bars and the diameter of wire thereon. The patent to Mueser merely shows the integral ribs formed on the bar and not a strand extending free thereof for the purpose of applicant's invention so that claim 2 is now believed to clearly define over this patent which is not intended or adapted for the purpose of this invention. The patent to Peabody does not show any spurs forming an enclosing wall for the kerf and adapted thereby
354 to retain the coil in position. As recited in claims 3 and 4 this is a novel means of securing the coils to the bar and should be allowed. An independent discussion of the claims is not believed to be necessary in view of the amendments and the foregoing statement of differences over the references.

"Respectfully submitted,

"E. B. Stocking,
"Attorney."

"September 27, 1906."

October 24, 1906, the application was again rejected the action reading as follows:

"This case has been considered as amended Sept. 27, 1906.

"Claims 1, 3, 4 and 5 are rejected on the Swiss patent of Record, in view of:

Kahn, 768 284, Aug. 23, 1904, M. R.,

which shows shear arms attached to the tension bar by being seated in saw-kerfs and grooves 356
and the metal of the bar compressed by the shear arms to maintain the same in its seat.

"Claim 6 is allowed.

"Does applicant wish the word 'coil' in both places where it occurs in line 2 of claim 2 to be changed to *coiled strand?*

"C. C. W. "W. A. Cowles

"Examiner Division 33."

Under date of October 31, 1906, this application was amended by canceling claims 1, 3, 4 and 5 and inserting claims 1, 2, 3 and 4 as they appear in the patent. Claim 2 was renumbered 357
claim 5, as above stated. The new claims were allowed without change, except that in claim 4 line 4 *coil* was substituted for *coiled.*

The argument which accompanied this amendment reads as follows:

"It is submitted that the claims as now presented clearly distinguish over the references of record which do not disclose applicant's bar. The Swiss patent which is relied upon by the Examiner shows windings carried by parallel rods and not secured to either of the rods so that there is nothing except the frictional contact of

the wire to retain the same against longitudinal movement on the rods, or a lengthwise sliding of the bar or wire coiled thereon. This patent does not show a fair instance of a spiral coil having every convolution extended beyond the bar, and even if one of the rods be removed would not anticipate applicant's invention because the remaining rod not being attached to the coil could not retain it in operative position. The Examiner will certainly concede that a structure which is inoperative to accomplish applicant's
359 functions or advantages cannot be a reference therefor, and even though the Swiss patent be reconstructed it lacks the features now defined by applicant's claims 1 and 2. In this connection it should be noted that Figures 1 and 2 of this patent are separate forms of the invention, as shown at 1^a and 2^a so that the Swiss patent does not show the wire deflected toward the opposite ends of the bar, and surely each convolution of the wire is not secured to the bar at two points. By applicant's structure the wire is held against any uncoiling by slipping of the bar, and also against longitudinal movement relative to the bar so that
360 the spiral strands when embedded in the concrete form a structure extending continuously from the center toward the opposite ends of the bar the strands being so disposed that the coil of one overlapping the supporting area of another thus securing a practically continuous support through the body of the concrete.

"While the patent to Kahn last cited shows a spur pressed upward from the bar, it certainly does not show applicant's kerf extended inward from one edge thereof having the overlapping spur by means of which the coil is re-

tained entirely within the area of the bar and hooked in the kerf so that it cannot be backed out or disengaged therefrom in packing the concrete material in position. The structure of spur which overlaps the coil when in position absolutely retains the latter against any movement relative to the reenforcing bar and being novel should be granted protection.

Respectfully,

"E. B. Stocking

"Attorney." 362

"October 30, 1906."

Under date of November 20, 1906, there was a further action of the Patent Office as follows:

"Responsive to amendment of October 30, 1906.

(*Copy*)

"Claim 2 has been renumbered 5.

"In line 4 of claim 4, 'coiled' should be *coil.*

"The case otherwise, is in condition for allow- 363
ance."

Under date of November 21, 1906, claim 4 was amended as required.

The notice of allowance was under date of December 3, 1906, and acknowledgment of the final fee was sent December 29, 1906, and the patent issued January 22, 1907, as above stated.

364

Abstract of Defendant's Exhibit C

This exhibit is the file wrapper and contents of the reissued letters patent in suit No. 14 182. This application was for a reissue of Vandenburgh's former patent 841,741 which has been considered in connection with Exhibit B. This original patent was dated January 22, 1907. The application for issue was filed July 1, 1916.

The petition is in the usual form. The specification and claims were issued as filed.

The oath reads as follows.

365

"State of California }
"City and County of San Francisco, } ss:

"George E. Vandenburgh, the above named petitioner, being duly sworn, deposes and says that he does verily believe himself to be the original, first and sole inventor of the improvement set forth and claimed in the foregoing specification and for which improvement he solicits a patent; that deponent does not know and does not believe that said improvement was ever before known or used before his invention thereof; that deponent is a citizen of the United States of

366 America, and resides at San Francisco, in the County of San Francisco, and State of California; that deponent verily believes that the letters patent referred to in the foregoing petition and specification and herewith surrendered are inoperative for the reason that the specification is defective and insufficient and that such defect and insufficiency consists in the omission therefrom of present claims 1, 2, 3 and 4, and in the use of the word 'rigidly' in line 1, original claims 1 and 2, and in the statement that the coils are secured to the reinforcing bar at two points in each convolution, lines 2 and 3, original claims 1

and 2, as well as in the use of the word 'end' in line 2, claim 3; that the original specification in no place makes use of the word 'rigidly' with respect to the manner of securing the coils to the bar, and that the bars and coils never were rigidly secured together in any of applicant's constructions, but that they were permanently secured together only, as stated in lines 85 and 86 of the printed copy of the specification; that there is an error in the use of said words two points in that while a single coil is secured to the bar at two points in each convolution that 368 where there are a plurality of coils there is only one more securing point than there are coils, and with respect to the word 'end' used in line 2 of original claim 3, that said error is not in accordance with the facts which are that the spurs on kerfs are on the *edge* of the bar and no where shown to be on the 'end' of the bar in the original drawing, and that the four claims substituted for claims 1, 2 and 3 are more limited than the claims appearing in the specification; that deponent further says that the error which renders said letters patent so inoperative arose from inadvertence, accident or mistake and without any 369 fraudulent or deceptive intention upon the part of deponent, in that he was personally unfamiliar with the prosecution of patent cases and did not fully understand that words used in the claims must be supported by wording in accordance with the specification and that such error arose with respect to claim 1 because of the purely accidental use by the attorney prosecuting the original application of words not in accordance with the construction, and with respect to claim 3 applicant believes that the word 'end' was a mere typographical error for the word *edge*, and he believes

370 *Abstract of Defendant's Exhibit C.*

with respect to claim 1 that he has claimed as his invention more than he had a right to claim as new; that as soon as said errors came to his knowledge and attention, he applied for this reissue, and that he is the sole owner of said letters patent and hereby offers to surrender the original letters patent.

"George E. Vandenburgh.

"Subscribed and sworn to before me, a Notary Public in and for the City and County of
371 San Francisco, and State of California, this 24th day of June, 1916.

"L. H. Anderson.

"Notary Public in and for the City and County of San Francisco, State of California. My commission expires December 27, A. D. 1918."

373

Defendant's Exhibit D

UNITED STATES DISTRICT COURT,

SOUTHERN DISTRICT OF NEW YORK.

GEORGE E. VANDENBURGH, Plaintiff, vs. CONCRETE STEEL COMPANY, Defendant.	In Equity 14-88. Re-issued Letters 14,182.

374

STIPULATION.

It is agreed between the parties hereto as follows:

1. That plaintiff has good and sole title to the patent in suit and that the parties are correctly described in the bill as amended.

2. That defendant has been and is manufacturing and selling devices of which Plaintiff's Exhibit 3 is a specimen, the latter having been furnished to plaintiff by defendant for use at the trial of this suit. 375

3. That printed or photographic copies of all letters patent may be used with the same force and effect at the trial as original copies, subject to correction, if necessary, by the originals.

4. That the respective dates of application and issue of said patents are as stated therein.

5. That the translation of the Kisserling German patent No. 73,004 contained in the file of

376 *Defendant's Exhibit D.*

patents marked Defendant's Exhibit A, is a correct translation of said German patent.

6. That copies of the file wrappers and contents of the reissue patent in suit and of the original of which said patent is a reissue, which are marked Defendant's Exhibits B and C respectively, are true copies of the Patent Office records and may be used with the same force and effect as certified copies.

377 7. That excerpts from the depositions of witnesses in the suit of plaintiff against Electric Welding Company in the United States District Court for the Western District of Pennsylvania, which excerpts are marked herein as Plaintiff's Exhibit 4, may be used with the same force and effect as though the said witnesses were called by the plaintiff and so deposed.

8. That Plaintiff's Exhibit 5 typifies the device on which the charge of infringement was based in said suit against Electric Welding Com-
378 pany.

9. That John F. Havemeyer, president of defendant company, if called as a witness, would testify that subsequently to the date of plaintiff's original patent and before the date of application for the reissue patent in suit, defendant commenced to make reinforcements for concrete columns similar to Plaintiff's Exhibit 3; that defendant had no knowledge of plaintiff's alleged invention or of plaintiff's original patent until the same was brought to its attention by a letter dated May 17, 1916, signed by C. P. Griffin, plaintiff's attorney, a copy of which letter is as follows:

Defendant's Exhibit D.

"San Francisco, May 17, 1916.

"Concrete Steel Company,
42 Broadway, New York City, N. Y.

Gentlemen:

I desire to notify your company that certain concrete steel reinforcement material manufactured by you is an infringement of patent No. 841,741, granted to my client G. E. Vandenburgh Jan. 22, 1907. This patent broadly covers the securing of spiral coils to reinforcing bars by means of a kerf cut in the reinforcing bar. Two specimen claims are as follows:

1. In a reinforcing bar, a spiral coil rigidly secured thereto at two points in each convolution thereof and extended beyond and free of said bar at the opposite side therefrom to the securing point.

4. A reinforcing bar provided upon one edge with a series of kerfs disposed diagonally to the length of the bar each having an overlapping integral spur projected toward the center of the bar, and a coil disposed in said kerfs and retained beneath said spurs.

This is due notice to you that you must cease the manufacture of any bars or concrete steel reinforcements which in any way infringe this patent, and in event that you fail to discontinue such manufacture suitable action will be taken against you for an injunction and an accounting.

Yours truly,

(Signed) C. P. Griffin."

382 *Defendant's Exhibit D.*

that after that letter was received, a copy of plaintiff's original patent was procured and examined by defendant, and on May 23, 1916, defendant sent a copy of said patent and a copy of said letters to its attorneys, together with the following letter:

"New York, May 23, 1916.

"Mr. L. E. Varney,
%Messrs. Emery, Booth, Janney & Varney,
149 Broadway, City.

383

Dear Sir:

We enclose herewith original letter from C. P. Griffin, Attorney, San Francisco.

We also enclose copy of the Vandenburgh patent, to which this letter refers. We have not replied to the letter and do not know that it is necessary, unless as a matter of courtesy.

In glancing through this patent, we note that it refers to a combination of reinforcing bar with a kerf cut in the bar and a spiral or rod ties in the kerf. It would seem

384

to me that the patent would be limited to the combination of a spiral attached rigidly to a reinforcing bar.

The spirals which we manufacture are made by a combination of coils of wire attached to an angle, which is slotted on one leg. The spiral is not rigidly attached, as is it made collapsible. The angle or spacer is used simply to stiffen the spiral until it is embedded in concrete. In other words, the angle is simply a mechanical device used to hold the spiral in place until the concrete is poured. The angle, however, is not figured

as a reinforcing bar, and the metal used in the angle does not enter into the figured stresses of the column.

I suppose Mr. Griffin might claim that the metal in the angle, whether figured or not, is still a reinforcing metal, but general practice does not allow this to be considered as reinforcement, as loose bars are inserted in the column to take care of the stresses.

If after looking this patent over, it is agreeable to you, I would suggest that you simply write Mr. Griffin and state that you 386 have investigated the matter and find that your clients, the Concrete Steel Company, have not infringed the Vandenburgh patent.

Very truly yours,

CONCRETE STEEL COMPANY,
(Signed) J. W. Havemeyer, Prest.

that said attorneys confirmed defendant in its view, as expressed in said letter of May 23, 1916, as to the apparent limitations of plaintiff's original patent, and that defendant thereafter continued to manufacture said devices in the be- 387 lief that it was free to do so and so notified plaintiff's attorney; that on June 12, 1916, defendant received the attached circular from plaintiff's attorney and sent it together with the following letter to its attorney:

"New York, June 12, 1916.

"Mr. L. E. Varney,
%Messrs. Emery, Booth, Janney & Varney,
149 Broadway, City.

Dear Sir:

I enclose herewith circular letter received from C. P. Griffin, San Francisco, which

388 *Defendant's Exhibit D.*

evidently follows up his previous letter to us.

You will note he shows a column collapsed and also shows a spiral column in which a 'T' section is used for spacer. This apparently would not be in accordance with the patent, which calls for a reinforcing bar with the spiral rigidly attached. The 'T' spacer used simply as a spacer and a stiffener, and I do not know of any cases where the 'T' section is used for structural purposes.

I am sending you this for your records.

389

Yours very truly,

CONCRETE STEEL COMPANY,
(Signed) J. W. Havemeyer, Prest.

that thereafter it heard nothing from plaintiff until about November, 1916, when defendant's president was in Chicago where he learned for the first time that plaintiff's original patent had been reissued whereupon defendant again wrote its attorneys under date of November 9, 1916, as follows:

390

"New York, November 9, 1916.

"Mr. L. E. Varney,
% Messers. Emery, Booth, Janney & Varney,
149 Broadway, City.

Dear Sir:

Sometime ago we took up with you the Vandenburgh patent No. 841,741, which referred to a spiral for a column, using a reinforcing bar as a spacing member. We had a letter from some attorneys on the

Pacific Coast, threatening suit against us, and upon investigating the matter we decided that the spiral we make does not infringe this patent. When in Chicago recently, I found that the Leonard Construction Company were being threatened with suit under this patent and that the patent had been reissued. Can you get a copy of the reissued patent? If so, I would like to have it, so that we can see just what the present claims are.

Very truly yours, 392

CONCRETE STEEL COMPANY,
(Signed) J. W. Havemeyer, Prest.

that thereafter and about January 9, 1917, defendant received the following notice, dated January 3, 1917, from plaintiff's attorney:

"San Francisco, January 3, 1917.

"The Concrete Steel Company,
42 Broadway, New York.

Sirs: 393

Several months ago I wrote your Company relative to the infringement by you of a patent owned by a client of mine, Mr. George E. Vandenburgh.

I am sending herewith a circular to bring the matter more clearly before you.

I have before me your catalogue of Havemeyer Bars, which shows on page 6 a construction mechanically identical with the construction shown in the circular herewith, and I also have before me a letter from your Patent Attorneys denying that you have ever manufactured or infringed the patent.

394 *Defendant's Exhibit D.*

I have just concluded a License Agreement with one of the largest manufacturers in the East on this subject matter, and if it is your desire to fight the matter rather than to give it the consideration justly due it I am content; but, before going to extremes, I wish to submit it to you again, and if any fair minded Patent Attorney will, in view of your circular on Havemeyer Bars, make the statement made to me in the letter from Emery, Booth, Janney & Varney I will drop the
395 whole matter, which certainly is a fair enough proposition to warrant its further consideration.

If you are interested in the matter, and will advise me I will be glad to take it up further with you. If not, I intend to proceed along other lines. The patent is reissue #14182 of August 15, 1916.

Yours truly,

(Signed) C. P. Griffin."

396 that nobody connected with defendant company ever saw a device of the character in suit which was built by plaintiff or by anybody associated with plaintiff; that the devices manufactured and sold by defendant, of which Plaintiff's Exhibit 3 is a specimen, were designed independently by defendant, and were not copied from anybody; that the longitudinal member in each of said devices were primarily designed by defendant as a spacer to hold the spiral strands properly separated during the placing of the concrete, and secondarily as a means for hold-

ing the spiral together during shipment from defendant's plant to the job where it was to be used; that the slotting of the longitudinal member to receive the spiral strands and the subsequent fastening of the strands therein by hammering together the open ends of the slots so that the spiral could be collapsed during shipment and at the same time retained within the slots, was a construction independently worked out by this defendant and particularly without any knowledge of plaintiff's patent or of plaintiff's alleged invention and as a natural and 398 obvious means of securing the spiral to the longitudinal; and that the longitudinal is made as light as it can be to save metal and is not used or figured as a reinforcing bar.

It is stipulated that the foregoing statement of what the said Havemeyer's testimony would be if he were called, may be used with the same force and effect as if the said Havemeyer had been called by the defendant and had so testfied.

JAS. H. GRIFFIN,
Solicitor for Plaintiff. 399

FRANCIS E. MURRAY,
Solicitor for Defendant.

New York, May 8, 1918.

400

Opinion

UNITED STATES DISTRICT COURT,

SOUTHERN DISTRICT OF NEW YORK.

GEORGE E. VANDENBURGH,

vs.

CONCRETE STEEL COMPANY,

401 Final hearing in Equity. Action on Claims 1, 2, 3 and 5 of Re-issued patent to plaintiff, No. 14,182. Original patent was No. 841,741, of which the application was filed May 9, 1906, patent issued January 22, 1907, surrendered and re-issue prayed July 1, 1916, re-issue granted August 15, 1916.

J. H. GRIFFIN, for Plaintiff.

L. E. VARNEY, for Defendant.

MEMORANDUM DECISION.

402 A formal statement of the alleged infringement clarifies this situation. Defendant makes and sells a "collapsible spiral" (Deft's Ex. 5, p. 6), used for strengthing concrete construction, consisting of a cylindrical helix of steel wire fitted (usually) to two "spacers" a diameter apart, and each engaging every convolution of the helix, of which the rise is so slight and the engagement with the "spacers" so loose that the construction which is normally stovepipe shape, can by moving the metal rods called "spacers" longitudinally in opposite directions be flattened out and then conveniently crated for transport.

These "spacers" are not re-enforcing bars in the sense that they are calculated addition to the ultimate strength of the steel and concrete structure; their function is only to hold the spiral in place until the concrete is poured—but, of course, they are of metal and do contribute whatever strength they possess—so would any other casual piece of steel.

To this apparatus there are two essentials, one that the helical convolutions be close, and second that the wire be so fastened to the "spacers" that it can turn in place; unless both of these 404 conditions are fulfilled it cannot collapse.

That this is not the exact thing Vandenburgh invented is too plain for argument; the assertion is that a wire spiral fastened to one piece of metal, such as defendant's "spacer", in the manner commercially used by defendant, and intended as an aid to concrete building, embodies the claims in suit; the addition of another spacer is immaterial and collapsibility is a function or attribute of what the claims define.

Whether the claims of the reissue do read on defendant's structure, is not a matter requiring much consideration. If such be the case, it does 405 not prove but only suggests infringement.

Nor, on the other hand, shall I spend time in dwelling on the "paper" nature of this patent. The style of strengthener for concrete now called infringing has been in growing use since 1907, but there is no proof at all that plaintiff has contributed to that growth, unless one is to believe that the mechanical world was moved by Fig. 4, the only portion of the disclosure suggesting even now defendant's device. On this

evidence it is clear that McClure 857,821, which issued a few months after the patent in suit, should have had a vastly greater influence, because its suggestions are so much more distinct.

It is preferred to ask what is always an important and often the vital question—what did Vandenburgh disclose?

His specification has remained substantially the same, since date of application; there were no changes of substance in the office and the reissue was sought only to procure a change of
407 claims. The invention has always been described as a "reinforcing *bar,*" which is to be "embedded in the plastic body to be supported thereby." Bars were old, therefore novelty in construction must be shown and it is disclosed that this bar is to be provided with "*one or more* spirally disposed coils *secured* to the bar," and forming a *truss* within the body of concrete." This securing of coils to bar may be "in any desired manner," but the preferred and disclosed means is a "series of Kerfs in one face of the bar *inclined away* from the *center of the bar* towards the *op-*
408 *posite ends* thereof"; in one of which Kerfs each convolution of the wire coil was inserted and the spur or lip of each Kerf "*forced downward* upon the coils;" thus the hammered down Kerfspurs "*permanently* retain" the wires "*in position.*" There was nothing new about this method of retention (Clark 589,593), while as for the mere act of fastening by any means a rigid metal bar longitudinally along a cylindrical helix of wire, I have only to look at the spring holder for pens

and pencils now before me and in the same use on my desk for twenty years last past.

Evidently, therefore, the patent could not generically cover a style of construction of which the elements are a coil of wire combined with any sort of metal rod secured to each other in any way as often as the periphery of the spiral touched the longitudinally placed rod. Unless the disclosure does reveal this fundamental and novel thought, it may be doubted whether what defendant does it within any justifiable range of equivalency; but decision is grounded on nar- 410
rower consideration.

I have quoted substantially all the verbal description of invention, and as soon as the drawings are examined it is seen just what Vandenburgh meant by a "truss," and exactly how he made one, and why he wanted it strong, fixed and rigid. Fig. 1 and its detail Fig. 3, with interlacing coils pointed away from the middle point of the ultimate completed construction, is a true truss frame, firm and rigid (except for probable resiliency or elasticity of wire), before any concrete poured. Fig. 4 shows a single wire, 411
a cheaper and weaker device, but identical in theory. This is Vandenburgh's invention; he never disclosed collapsibility; what he shows will not collapse; what he does show bears scarcely a remote resemblance to what defendant makes and sells.

It is urged, however, that whether Vandenburgh saw the possibilities of a mere spiral guide for concrete or not, he disclosed the fact. If so, it must be by Fig. 4 alone. But, as said above, this is called "a modified form using one coil";

using one coil for what? Of course, for the same purposes and in the same manner as he preferred to use a double coil; *i, e.*, so as to be rigid, truss-like and non-collapsible.

Turning to the reissue, it is found that claims 1 and 2 originally called for a spiral coil "rigidly" secured to the reinforcing bar; as reissued the phrase is "permanently" secured. The evidence makes it plain that this change was made to catch manufacturers like defendant, but I shall not consider intervening rights because it is
413 thought clear that *rigidly* is exactly what the patentee meant. This is seen from the nature of his "truss" and the representations made in argument to the examiner. (Original file wrapper, Amendments A and B.)

Claims 5 (original 4) and 3 are in too general language. They go beyond the disclosure, exceed the invention and are false claims unless construed to mean by *"retained"* rigidly fixed in place, and (5) by "Kerfs disposed diagonally," Kerfs incline half one way and half the other—substantially as shown.

414 In result, it is held that the reissue was unlawful as to claims 1 and 2 if "permanently secured" differs in meaning from "rigidly secured" because the specification meant "rigidly secured;" whether this invalidates the reissue need not be discussed. Further held that Claims 3 and 5 are not infringed by defendant, and finally held that the only invention revealed by the specification is the exact construction described and pictured in Figs. 1 and 6.

Bill dismissed with costs.

C. M. Hough,
U. S. C. J.

May 13, 1918.

415

Final Decree

At an Equity Term of the United States District Court for the Southern District of New York held in the Woolworth Building in the Borough of Manhattan of the City of New York on the 27 day of May, 1918.

Present—Hon. Charles M. Hough,
Circuit Judge.

416

George E. Vandenburgh,
Plaintiff,
vs.
Concrete Steel Company,
Defendant.

In Equity.
14-88.

This cause came on to be heard at this term, and was argued by counsel, and thereupon, upon consideration thereof, it was Ordered, Adjudged and Decree, that the bill of complaint be dismissed with costs.

417

C. M. Hough,
U. S. C. J.

Approved as to form:
James H. Griffin,
Solicitor for Plaintiff.

Lucius E. Varney,
Solicitor for Defendant.

418

Petition for Appeal

UNITED STATES DISTRICT COURT,

SOUTHERN DISTRICT OF NEW YORK.

GEORGE E. VANDENBURGH, Plaintiff, VERSUS CONCRETE STEEL COMPANY, Defendant.	In Equity 14-88. Re-issued Letters Patent 14,182.

419

The plaintiff in the above entitled suit believing himself aggrieved by the decision entered after final hearing in the above entitled case May 13th, 1918, dismissing plaintiff's Bill of Complaint with costs:

Comes now by his solicitors and counsel James H. Griffin and Carlos P. Griffin, and petitions said court for an order allowing plaintiff to appeal from said decree to the Honorable the United States Court of Appeals for the Second Circuit, under and according to the laws of the United
420 States in that behalf made and provided, and also for an order fixing the sum of security which plaintiff shall give and furnish upon said Appeal.

Notice is hereby also given to counsel for defendant of this petition.

JAS. H. GRIFFIN,
Solicitor.

(Sgd.) CARLOS P. GRIFFIN,
Of Counsel.

Dated: June 1st, 1918,
San Francisco, Cal.

421

Assignment of Errors on Appeal

UNITED STATES DISTRICT COURT

SOUTHERN DISTRICT OF NEW YORK

GEORGE E. VANDENBURGH, Plaintiff,	In Equity 14-88
VERSUS	Reissued Letters Patent 14,182.
CONCRETE STEEL COMPANY, Defendant.	

422

Now comes the plaintiff, above named, by its solicitors, and specifies and assigns the following as errors upon which he will reply on his appeal to the United States Circuit Court of Appeals for the Second Circuit from the Decree of United States District Court for the Southern District of New York, filed May 13th, 1918, in which plaintiff's Bill of Complaint was dismissed with costs.

FIRST: Error is assigned in not adjudging that the exact thing defendant invented consists of a 423
concrete reinforcement having helical convolutions so fastened to the spacers that they can turn in place.

SECOND: Error is assigned in that it is not held, adjudged and decreed, that defendant's structure is an infringement even though the claims of the reissue be read on defendant's structure.

THIRD: Error is assigned in the holding that the spring holder for pens and pencils is relevant to reinforced concrete construction.

424 *Assignment of Errors on Appeal*

FOURTH: Error is assigned in the holding that the inventor wanted to make a truss * * * "rigid."

FIFTH: Error is assigned in the holding that "Figure 1 and its detail Figure 3 * * * is firm and rigid * * * before any concrete is poured."

SIXTH: Error is assigned in the holding that "Vandenburgh * * * never disclosed collapsibility," further holding that "what he shows will
425 not collapse" as well as in the further holding that "what he does show bears scarcely a remote resemblance to what defendant makes and sells."

SEVENTH: Error is further assigned in the holding that the reinforcing disclosed in the patent is in any way or has anything to do as "a mere spiral guide for concrete."

EIGHTH: Error is further assigned in the holding that the structure of figure 4 of the patent for a structure before the concrete is poured "*so as to be rigid,* truss-like and non-collaps-
426 ible."

NINTH: Error is further assigned in holding that Vandenburgh's patent has a property, *i. e.,* "non-collapsibility" which it does not have and which it was not intended to have, and which was not referred to in the specification of the patent.

427

TENTH: Error is assigned in the holding that the word "rigidly is (was) exactly what the patentee meant" as used in his claim 1.

ELEVENTH: Error is further assigned in the holding that "claims 5 and 3 are in too general language," the error is further assigned in the holding that said claims "go beyond the disclosure, exceed the invention and are false claims unless construed to mean by 'retained' rigidly fixed in place."

428

TWELFTH: Error is further assigned in the holding that "kerfs disposed diagonally" means "kerfs inclined one-half one way and half the other substantially as shown."

THIRTEENTH: Error is further assigned in the failure to make a definite holding as to the lawfulness or "unlawfulness" of the reissue patent.

FOURTEENTH: Error is further assigned in the holding that the "reissue was unlawful as to claims 1 and 2 if 'permanently secured' differs in meaning from 'rigidly' secured.' "

429

FIFTEENTH: Error is further assigned in the holding that "claims 3 and 5 are not infringed by defendant."

SIXTEENTH: Error is further assigned in the holding that plaintiff's "only invention revealed by the specification is the exact construction described and pictured in figures 1 and 6."

430 *Assignment of Errors on Appeal*

SEVENTEENTH: Error is further assigned in not adjudging that the claims of plaintiff's patent are all valid with respect to any of his constructions disclosed in the patent and in not adjudging and decreeing that defendant infringes claims 1, 2, 3 and 5, and in not adjudging that plaintiff have an injunction and an accounting from defendant.

JAS. H. GRIFFIN,
Solicitor.

431

CARLOS P. GRIFFIN,
Of Counsel.

San Francisco, Cal.,
June 1st, 1918.

433

Order Allowing Appeal

UNITED STATES DISTRICT COURT

SOUTHERN DISTRICT OF NEW YORK

GEORGE E. VANDENBURGH, Plaintiff,	In Equity. 14-88.
VERSUS	Reissued.
CONCRETE STEEL COMPANY, Defendant.	Letters Patent 14,182.

434 In the above entitled action in equity, the plaintiff having filed his petition for an order allowing an appeal from the decree of this court made and entered in this action on May 13th, 1918, dismissing plaintiff's Bill of Complaint with costs, and plaintiff having filed his assignment of errors.

Now, upon motion of James H. Griffin, solicitor for plaintiff, it is hereby ordered that said appeal be, and is allowed to plaintiff, to the United States Circuit Court of Appeals for the Second Circuit from the said decree dismissing plaintiff's Bill of complaint with costs, and that the 435 amount of plaintiff's bond for said appeal be, and the same is hereby fixed in the sum of Two hundred and fifty dollars ($250).

It is further Ordered, that upon the filing of such security, a certified transcript of the record and proceedings herein be forthwith transmitted to the said United States Circuit Court of Appeals for the Second Circuit in accordance with the statutes and equity rules of the Supreme Court of the United States.

Dated, Oct. 5, 1918.

AUGUSTUS N. HAND,
Judge.

436

Citation

By the Honorable Augustus N. Hand, one of the Judges of the District Court of the United States for the Southern District of New York, in the Second Circuit.

To Concrete Steel Company, Defendant. GREETING:

YOU ARE HEREBY CITED and admonished to be and appear before a United States Circuit Court of Appeals for the Second Circuit, to be holden at the Borough of Manhattan in the City of New
437 York, in the District and Circuit above named, on the 7th day of November, 1918, pursuant to a Petition for Appeal and Assignment of Errors filed in the Clerk's Office of the District Court of the United States for the Southern District of New York, where George E. Vandenburgh is the appellant and plaintiff and you are appellee, to show cause, if any there be, why the errors in said appeal mentioned should not be corrected and why speedy justice should not be done in that behalf.

GIVEN UNDER MY HAND at the Borough of Manhattan, in the City of New
438 York, in the District and Circuit above named, this 8th day of October, in the year of our Lord One Thousand Nine Hundred and Eighteen, and of the Independence of the United States the One Hundred and Forty-third.

AUGUSTUS N. HAND,
Judge of the District Court of the United States for the Southern District of New York, in the Second Circuit.

Service acknowledged this 9th day of October, 1918.

LUCIUS E. VARNEY.

439

Stipulation

UNITED STATES DISTRICT COURT

SOUTHERN DISTRICT OF NEW YORK

GEORGE E. VANDENBURGH, Plaintiff, vs. CONCRETE STEEL COMPANY, Defendant.	In Equity. 14-88 Reissued Letters Patent 14,182.

440

IT IS HEREBY STIPULATED by and between the parties hereto that the record on appeal shall consist of the following and nothing else:

1. Pleadings.

2. Minutes of the trial.

3. Paper exhibits.

4. Opinion.

5. Decree. 441

6. Appeal papers, including stipulations.

JAS. H. GRIFFIN,
Solicitor for Plaintiff.

LUCIUS E. VARNEY,
Solicitor for Defendant.

October 8th, 1918.

442

Stipulation

UNITED STATES DISTRICT COURT

SOUTHERN DISTRICT OF NEW YORK

GEORGE E. VANDENBURGH,
Plaintiff-Appellant,
vs.
CONCRETE STEEL COMPANY,
Defendant-Appellee.

443

IT IS HEREBY STIPULATED AND AGREED, that the foregoing is a true transcript of the record of the said District Court in the above entitled matter as agreed on by the parties.

Dated, December 10, 1918.

JAS. H. GRIFFIN,
Attorney for Appellant.

LUCIUS E. VARNEY,
Attorney for Appelee.

444

445

Clerk's Certificate

United States of America,
Southern District of New York. } ss:

GEORGE E. VANDENBURGH,
Plaintiff-Appellant,
vs.
CONCRETE STEEL COMPANY,
Defendant-Appellee.

446 I, Alexander Gilchrist, Jr., Clerk of the District Court of the United States of America for the Southern District of New York, do hereby certify that the foregoing is a correct transcript of the record of the said District Court in the above entitled matter as agreed on by the parties.

IN TESTIMONY WHEREOF, I have caused the seal of the said Court to be hereunto affixed, at the City of New York, in the Southern District of New York, this 10th day of December, in the year of our Lord one thousand nine hundred and eighteen, and of the Independence of the said 447 United States the one hundred and forty-third.

ALEX. GILCHRIST.
Clerk.

(Seal)

448

Opinion

UNITED STATES CIRCUIT COURT OF APPEALS

FOR THE SECOND CIRCUIT

No. 172—October Term, 1918.

Argued March 3, 1919. Decided April 16, 1919.

449 GEORGE E. VANDENBURGH,
Plaintiff-Appellant,

vs.

CONCRETE STEEL COMPANY,
Defendant-Appellee.

Appeal from the District Court of the United States for the Southern District of New York.

Before WARD, ROGERS and MANTON, Circuit Judges

450

James H. Griffin, for Plaintiff-Appellant.
Lucius E. Varney, for Defendant-Appellee.

WARD, Circuit Judge.

U. S. Reissued Patent 14182 to George E. Vandenburgh for a concrete reinforcing bar was held void for want of invention by the District Court

for the Western District of Pennsylvania in the suit of *Vandenburgh v. Electric Welding Co.*, while the court below dismissed the bill in this case against the Concrete Steel Company for non-infringement. Both courts held that the original patent did not contemplate collapsibility of the structure because the spiral coil was described as rigidly fixed by kerfs and spurs on the reinforcing bar. For this reason it was held that claims 1 and 2 of the reissue which were intended to cover collapsibility of the structure were invalid as too broad. We agree in this conclusion. 452

But claim 3 of the reissue is literally the same as claim 3 of the original patent and claim 5 of the reissue is literally the same as claim 4 of the original patent. These claims should be construed consistently with the specifications, which are also literally the same in each patent, as meaning that the spiral coil is rigidly connected with the longitudinal bar at each point of contract. So construed the claim describes a continuous spiral rigidly and integrally connected with kerfs and spurs in the bar constituting a trusslike structure within the body of the concrete resisting lateral and longitudinal strains 453 and which can be more cheaply manufactured than if the spiral were riveted or welded to the bar at each point of contract.

The defendant's witness Cummings frankly admits that this form of reinforcing structure was new in cement work and has come into general use. The fact that claims 1 and 2 of the reissue are invalid as too broad does not invalidate claims 3 and 5, *Gage v. Herring*, 106 U. S., 640,

646. The defendant's structure when set up to receive the concrete is exactly the same as plaintiff's except that the spiral coil is not rigidly fixed by kerfs and spurs on the bar. This enables the structure to be collapsed when not in use, a commercial improvement for purposes of shipment but which does not justify the defendant's appropriation of the plaintiff's structure.

The decree is reversed with half costs to the plaintiff.

457

Order for Mandate.

At a Stated Term of the United States Circuit Court of Appeals, in and for the Second Circuit, held at the Court Rooms in the Post Office Building in the City of New York, on the 26th day of April, one thousand nine hundred and nineteen.

Present:

HON. HENRY G. WARD,
HON. HENRY WADE ROGERS, 458
HON. MARTIN T. MANTON,
Circuit Judges.

GEORGE E. VANDENBURGH,
Plaintiff-Appellant,
vs.
CONCRETE STEEL COMPANY,
Defendant-Appellee.

Appeal from the District Court of the United States for the Southern District of New York. 459

This cause came on to be heard on the transcript of record from the District Court of the United States, for the Southern District of New York, and was argued by counsel.

460 *Order for Mandate*

On Consideration Whereof, it is now hereby ordered, adjudged and decreed that the decree of said District Court be and it hereby is reversed with one-half costs to the appellant. It is further ordered that a Mandate issue to the said District Court in accordance with this decree.

H. G. W.,
M. T. M.

Endorsed:

461 United States Circuit Court of Appeals—Second Circuit—G. E. Vandenburgh—v.—Concrete Steel Co.,—Order for Mandate—

United States Circuit Court of Appeals—Second Circuit—Filed April 28, 1919.—William Parkin, Clerk.

UNITED STATES OF AMERICA,
Southern District of New York, ss:

I, William Parkin, Clerk of the United States Circuit Court of Appeals for the Second Circuit, do hereby Certify that the foregoing pages, numbered from 1 to 154 inclusive, contain a true and complete transcript of the record and proceedings had in said Court, in the case of George E. Vandenburg, Plaintiff-Appellant, against Concrete Steel Company, Defendant-Appellee, as the same remain of record and on file in my office.

In testimony whereof, I have caused the seal of the said Court to be hereunto affixed, at the City of New York, in the Southern District of New York, in the Second Circuit, this 17th day of January in the year of our Lord One Thousand Nine Hundred and twenty-two and of the Independence of the said United States the One Hundred and forty-sixth.

[Seal of the United States Circuit Court of Appeals, Second Circuit.]

WM. PARKIN,
Clerk.

Interlocutory Decree on Mandate

At a Stated Term of the United States District Court, held in and for the Southern District of New York, at the Post Office Building this 15th day of May, 1919.

Present:

HON. AUGUSTUS N. HAND,
United States District Judge. 2

GEORGE E. VANDENBURGH, Plaintiff, vs. CONCRETE STEEL COMPANY, Defendant.	In Equity No. 14-88. Reissued Letters Patent No. 14,182.

WHEREAS the decree heretofore entered in the above-entitled action was by the United States Circuit Court of Appeals for the Second Circuit affirmed as to claims 1 and 2, and reversed as to claims 3 and 5 of reissued letters patent in suit 3 No. 14,182 and a mandate pursuant thereto has been filed in this court on April 29, 1919,

4 *Interlocutory Decree on Mandate.*

IT IS ORDERED, ADJUDGED AND DECREED:

(1) That the said mandate be and hereby is made the order and decree of this Court.

(2) That the final decree of this Court be vacated and the appeal bond of the plaintiff cancelled.

(3) That at the times mentioned in the bill of complaint, George E. Vandenburgh was and is
5 now the sole owner of United States reissued letters patent No. 14,182, granted August 15, 1916. That claims 1 and 2 of said reissued letters patent are void and of no effect; that claims 3 and 5 of said reissued letters patent are good and valid in law; that the defendant has infringed the same.

(4) That the plaintiff recover from defendant the damages which said plaintiff has suffered and such increase thereof as may be allowed by this court pursuant to law and the profits which the defendant has realized by reason of the infringe-
6 ment.

(5) That a permanent injunction issue out of and under the seal of this Court and enjoining the defendant, its agents, employees, workmen and others acting for it and in its behalf from a further infringement of claims 3 and 5 of said reissued letters patent.

Interlocutory Decree on Mandate.

(6) That the cause be referred to William Parkin, Esq., Standing Master in Chancery of this Court, to take and report to the Court an account of damages sustained by the plaintiff and of the profits received by the defendant from the said infringement, with power in the Master to compel the production of books and papers necessary for an accounting.

(7) That the defendant and its representatives be required to attend before such Master at convenient times.

(8) That the plaintiff, have and recover from the defendant one-half of its costs and disbursements in the Circuit Court of Appeals, as taxed in the sum of $78.48.

AUGUSTUS N. HAND,
U. S. D. J.

10

Master's Order

UNITED STATES DISTRICT COURT,

SOUTHERN DISTRICT OF NEW YORK.

GEORGE E. VANDENBURGH, Plaintiff, against CONCRETE STEEL COMPANY, Defendant.	In Equity No. 14-88.

11

TO THE ABOVE DEFENDANT:

Pursuant to the Order of this Court entered May 15th, 1919, I hereby direct you to file with me within twenty (20) days from the date hereof, after serving a copy on the plaintiff, a statement of account, showing:

1. The number of articles which infringed claims three (3) and five (5) of Reissued Letters patent in suit #14182, made or sold by you, the date of each such sale, and the person to whom each article was sold.

12

2. An itemized statement showing the cost of manufacturing each of said articles.

3. An itemized statement showing the cost of selling each of said articles.

13

4. An itemized statement of all other costs, if any, entering into the manufacture or sale of such articles.

5. The profit derived from the sale of each of such articles.

Dated, New York, May 16th, 1919.

WM. PARKIN,
MASTER.

14

Copy received May 16, 1919.
L. E. VARNEY,
Sol. for Def.

16

Case

UNITED STATES DISTRICT COURT,

SOUTHERN DISTRICT OF NEW YORK

GEORGE E. VANDENBURGH,
Plaintiff,
against
CONCRETE STEEL COMPANY,
Defendant.

17

Before: WILLIAM PARKIN, ESQ., Master.

Hearing before the Master pursuant to Master's order and motion for stay.

Motion for stay has been denied.

APPEARANCES:

THE MASTER;

18 O. ELLERY EDWARDS, ESQ., and CARLOS P. GRIFFIN, ESQ., for Plaintiff.

THOMAS J. JOHNSTON, ESQ., and
MESSRS. EMERY, BOOTH, JANNEY & VARNEY, (Mr. Johnston) for defendant.

It is stipulated by and between counsel that the stenographer reporting this case for the use of

the Master shall furnish copies one each to counsel for plaintiff and counsel for defendant; the plaintiff will pay for the Master's copy and for his own copy, and the defendant will pay for its copy, upon delivery or upon rendering the bill. The expense will be adjusted in settlement of the cost. This is to apply to the taking of plaintiff's proofs. When the defendant's proofs are taken the Master's copy will be paid for by the defendant.

19

Mr. Edwards: I except to each and every item of the statement of account filed before the Master, and ask for the production of the witnesses as directed by the Master's order.

20

Mr. Johnston: I move to quash the Master's order dated October 6, 1919, because it is contrary to law and puts a burden of proof upon the defendant; because it is contrary to practice authorized and required by Supreme Court Rule in Equity No. 63, and also Rule 62 and the decisions interpreting them; and because it was entered without notice to the defendant, or an opportunity to be heard thereupon, and is therefore void. In this connection I call the attention of the Master to the case of Beckwith v. Malleable Iron Range Co., 207 Fed., 848, a decision in which Judge Geiger, of the District Court in Wisconsin, interprets the rule and states what he regards to be the correct practice.

21

I desire to say, however, that I think the plaintiff will be entitled not only to file exceptions putting the account in issue at this time, but also

to file an exception based upon any testimony which he may take, if proper ground of exceptions shall be developed by the testimony and is not apparent from the account itself. With this exception I think the case referred to outlines a correct practice. I believe it is undoubted that the burden of proof is on the plaintiff, and that he must close his case before the defendant either is required or can be required to examine witnesses at all. This is quite aside from the question of producing any person and employe of the
23 defendant whom the Master may direct to be produced, as we will gladly waive subpoena, but such witnesses when produced are the plaintiff's witnesses and must be examined with that understanding. After the plaintiff's case is closed we may or not be required to put in testimony, but until that time any order requiring us, as does this, to produce "your" (that is the defendant's) witnesses, appears to me to be void.

Mr. Griffin: In order that this record may be clear upon this subject, I insist that this hearing be proceeded with forthwith and continuously. I
24 am in New York from San Francisco at great expense both to myself and to my client; during the time I am away my office is practically closed. This hearing is for the purpose of examining the account heretofore filed by defendant in response to an order of the Circuit Court of Appeals, overruling a decree heretofore entered by the District Court for the Southern District of New York, and nearly six months has expired since

that decree was overruled so that defendant has had ample time within which to prepare and submit a proper account. 25

Mr. Johnston: That account has been prepared and submitted, and stands so far without exception.

Mr. Griffin: The account is objected to for sundry reasons, the principal of which are that the items do not agree among themselves, and that it is impossible to ascertain therefrom all of the facts relevant to the costs and sales price of the materials therein referred to. It is also 26 objected to upon the ground that it is incomplete. Further objections will be reserved to be made whenever ascertained.

Mr. Edwards: I would like to call attention of the Master to Rule 62, which gives him full control of these proceedings.

Mr. Johnston: That rule was also dealt with by Judge Geiger in this decision.

Mr. Edwards: I ask that the Master rule that the proceedings go forward forthwith and without delay.

The Master: In view of Mr. Griffin's attendance here from San Francisco, I think the pro- 27 ceedings should go ahead without any delay. The plaintiff has a right to examine the accounting parties under Rule 62, and I therefore direct that the defendant produce before me the party who prepared and swore to the account which has been filed with me, for examination by the plaintiff.

28 It is stipulated by and between the parties hereto that Carlos P. Griffin, Solicitor for Plaintiff, if called would testify as follows:

I am familiar with the facts of this case, and I have been identified with the same since it began, and I have been familiar with the licensing of people under the patent in suit, and attended to all matters incidental thereto, and I am the only person who has full knowledge of such licenses. I further state that only one such license was granted during the time covered by this
29 accounting, and it was to the Concrete Steel Products Company, and was at the rate of $3 per ton. They have paid for something less than 100 tons of spirals made in accordance with the invention of the patent in suit. This is the only license of any kind which was granted on or subsequent to the date of reissue of the patent in suit and to and including the date of the filing of the injunction in this case, or the date of the filing of the account; it is true of both cases.

Adjourned to Saturday morning, at 10 a. m.

It is directed that the party who prepared the account attend at that time.

Mr. Johnston: I give notice that it is impossible to comply with the order, on account of work in my hands in preparation for the hearing of cases in the Courts of Appeals, both in the Second Circuit and in the Third Circuit. If I can find anyone with sufficient familiarity with the case to take my place I will do so, and I will notify opposing counsel and the Master, but at the present time I know of no one who can do so. I think the order is beyond the power of the Master.

34 *R. W. Barbour—For Plaintiff—Direct.*

Vandenburgh v Concrete Steel Co.

New York, October 11, 1919.
10 a. m.

Before: WILLIAM PARKIN, ESQ., Master.
Met pursuant to adjournment.

Present, Mr. Edwards, Mr. Griffin and Mr. Whittemore.

35

R. W. BARBOUR, being duly sworn and examined as a witness for plaintiff, testifies as follows:

By Mr. Griffin:

Q1. By whom are you employed? A. The Concrete Steel Company.

Q2. In what capacity? A. In the sales department.

36 Q3. To what extent do you have knowledge of the sales department of the Concrete Steel Company? A. I handle the details of the sales of the New York office.

Q3a. Where do you sell from the New York office? A. I don't know as I just understand.

Q4. What territory does the New York office sell into? A. In the New York district.

Q5. And you have charge only of the New York sales? A. I wouldn't put it that way; I

37

would not say I have charge of the New York sales. I have charge of the details in connection with the sales department in the New York territory.

Q6. The products sold in the New York office are sent to outside territory as well? A. Oh, yes.

Q7. Into what territory are they sold? A. Wherever the job happens to be.

Q8. So that the New York office practically covers the entire field of endeavor of the Concrete Steel Company? A. I would hardly say 38
that, no, because contractors in the New York district as a rule have jobs around New York, or adjacent to New York; they are apt to.

Q9. Is there another sales office of the Concrete Steel Company than the one you are employed in? A. We have other sales offices.

Q10. Where? A. They are distributed in different parts of the country.

Q11. Where, will you give a list of them? A. One in Philadelphia, Birmingham, Boston, Chicago, Cleveland and Syracuse.

Q12. Any in Youngstown? A. No, sir, there 39
is no sales office in Youngstown.

Q13. Where are the fabricating plants located? A. What do you mean by fabricating plants?

Q14. Plants where the steel is produced in the form in which you sell it? A. We do very little fabricating; it is mostly Havemeyer.

Q15. You make spiral slotted bars? A. Yes, we do—coil spiral.

40 *R. W. Barbour—For Plaintiff—Direct.*

Q16. And you do the slotting of the bars that hold the spirals in position? A. Yes.

Q17. Where are the plants that slot those bars located? A. Camden and Youngstown.

Q18. Any other? A. I think that is all.

Q19. Is there any work at Staten Island? A. No, sir.

Q20. Have you a plant of any kind at Staten Island? A. Not to my knowledge, unless it has been recently acquired and I have not been informed.

41 Q21. How long have you been with this company? A. Four years last May.

Q22. Are you fully conversant with the materials made by the Concrete Steel Company? A. In a general way, yes, as a man connected with the sales organization would have to be, to a certain extent.

Q23. Are you acquainted with persons in the sales departments of the other offices? A. Yes, sir.

Q24. Can you give me the names of those persons who would be likely to know more about this

42 than you? A. No, I don't think they would know anything more about it than I do.

Q25. Can you give me the names of those people? A. No, I can't give you the names of anyone in the sales organization that would know more than I about it.

Q26. Can you give me the names of persons with each organization so that I can ascertain from them what each department is doing? A. You mean the different district sales managers?

Q27. The different sales managers? A. Yes, I can give you those names.

Q28. Will you give them to the stenographer? A. I don't know whether I can give the initials: Mr. Dale, the Philadelphia district sales manager; Mr. Piez is the district sales manager in the Birmingham office; Mr. Lyon, either Lyon or Lyons I don't know which, is the district sales manager in the Boston office; and Mr. Barnett is,—I think his title is western sales manager.

Q29. At what office? A. Chicago. 44

Q30. And Boston? A. I have given Boston, Mr. Lyon.

Q31. What are the materials made by the Concrete Steel Company, that is, give me a full list of the materials produced? A. You mean that we manufacture?

Q32. That you manufacture and sell? A. I was going to say we really don't manufacture anything, that is not the raw material.

Q33. I am not concerned with that; what does the company do? A. We are distributors of Havemeyer bars; we sell spiral wire, we sell certain other products which we call specialties. 45

Q34. What are the specialties? A. Different devices for holding bars in place.

Q35. Of what character? A. They are small wire devices.

Q36. Do you know what the percentage of the business done by the company in spiral bars is to the other portions of the business? A. No,

sir, I don't; comparatively small; further than that I don't know.

Q37. Would you say it was 10%? A. I would not want to say because I could not truthfully answer; I don't know.

Q38. You understand what is the subject matter of this action, do you not, collapsible spirals? A. Yes, sir, spirals.

Q39. You ship those spirals referred to in this report—or have you seen the report? A. I haven't no, sir.

47 Q40. Have you seen the report of this matter prepared by Mr. Harry Bahr? A. I have not.

Q41. In any event, these spirals are shipped collapsed, connected to some longitudinal bars, you understand that to be the subject matter of this suit? A. I understand that to be the subject matter of this suit, but the spirals are not all shipped in that way, not in my territory.

Q42. What percentage are shipped in any other way? A. You mean the territory I know about, that is within New York City or a radius of 25 miles of New York City?

48 Q43. Where you are selling? A. In New York City or a radius of 25 miles from New York, they ship what we call field assembled, that is, the coil wire is shipped, it is coiled to diameter and shipped separate as a coil then the angles are punched and shipped separate, that is on account of a restriction.

Q44. Assembled by you or assembled by the contractor? A. By the contractor on the job,

what we call field assembly; that is on account of a restriction, I think it is, Metal Lathers Union; they won't allow us—they won't allow I don't know as I should say "us", but they won't allow the contractors to use spiral in any other way in New York City or within radius of 25 miles of New York.

Q45. What percentage did you say was shipped knocked down for field assembly, what percentage collapsed out of all that are sold in the New York office? A. Most of the spirals shipped from the New York office, a greater 50
part are used in New York City or within a radius of 25 miles of New York, because as you probably know a contractor does not like to take a job very far from his home office.

Q46. Are you still engaged in shipping spirals knocked down and with the slotted bars for field assembly? A. What we call field assembly?

Q47. Yes? A. Yes, sir, that is the loose coils.

Q48. Together with the notched bars for field assembly? A. What do you mean, sometimes they go in the same shipment, sometimes not.

Q49. To the same contractor? A. Oh, yes, 51
to the same contractor.

Q50. How much business has been done in spirals, to your knowledge, out of the New York office since August 15th, 1916? A. Since August 15, 1916?

Q51. Down to the time of the injunction, say July 1st? A. I couldn't say, it would be a hard thing to say.

52 *R. W. Barbour—For Plaintiff—Direct.*

Q52. Have you access to any figures? A. We could get them, yes, sir.

Q53. Have you any personal access to such figures? A. Through others in the office.

Q54. Are you familiar with the steel prices throughout the period from August 15, 1916, down to July 1, 1919? A. What kind of steel?

Q55. Prices of spiral steel reinforcing? A. I couldn't recall them.

Q56. Have you access to any books or information that you would be able to produce the
53 prices of spiral steel and the slotted bars throughout that period? A. I could go back over the orders, yes, sir.

Q57. Could you ascertain for me the amount of spirals shipped by the Concrete Steel Company since August 15th, 1916, set up, and the amount of spirals sold coiled and with slotted bars to be set up by the contractor in the field? A. Yes, sir.

Q58. Will you do so and have that figure at our next hearing? A. It would take some time, how soon is the next hearing?

54 Q59. Next week, Tuesday? A. I will try to.

Mr. Griffin: In order that the record may be straight, I will ask that the Master direct the witness to produce the figures for the spirals sold connected to the bars, and for the spirals sold separate from but with slotted bars to be so connected in the field, at the earliest possible date.

Mr. Wittemore: There is no objection to this if the order is restricted to

55 spirals and bars which the Concrete Steel Company knew were to be assembled to produce the Vandenburgh combination. It is of course obvious to the Master that coiled wire and slotted bars are standard articles of commerce.

The Master: I will direct the witness to produce the statement so far as it relates to any combination which the company knew, or had reason to believe was to be used in that combination.

56 Mr. Griffin: I will ask the witness to produce at our next hearing figures showing the number of tons of spirals connected to the longitudinal bars shipped by his company, and also the number of tons or spirals shipped by his company in conjunction with or to the same job with notched bars for holding those spirals and to be set up in the field by the contractor, and the date of each shipment, covering the whole operations of the company.

The Master: I so direct.

57 Mr. Whittemore: I would like to call the attention of the Master to the fact that this witness is in the New York sales office and has no knowledge of sales other than those made in his office.

The Master: There are others who can make up the statements.

Q60. When was the last shipment, to your knowledge or recollection, of spiral coils, separate? A. What do you mean by bars?

Q61. Notched bars? A. We don't notch any bars.

Q62. Where do you get them? A. We don't notch bars.

Q63. You notch angles? A. Yes, sir, angles; I have to make that distinction; we never notch bars.

Q64. When was the last shipment of spirals and notched angles shipped separate to any job? A. I couldn't give the exact date, not from memory.

59 Q65. Who was it sent to? A. I don't know that I could say that.

Q66. Where was it sent? A. The New York City section.

Q67. Within a week? A. Well, I couldn't say.

Q68. Within two weeks? A. I would rather refer to my records before I answer that.

Q69. When was your last sale? A. I made a sale the other day of notched angles, no spiral wire at all; the contractor was going to supply the spiral wire.

Q70. When was that, a week ago? A. I should say about a week ago, yes; of course there was

60 no wire sold in connection with that.

Q71. When was the most recent sale previous to that? A. I sold coiled wire—I couldn't say, I would not want to answer without referring to my records.

Q72. Is there anybody in the sales department who knows more about the sales than you do? A. You mean the New York sales?

Q73. The New York sales? A. I don't think so.

61

Q74. And you can't tell me whether there were any sales within three weeks of coils and notched angles? A. You mean all together?

Q75. Sent to the same job; was it within four weeks? A. Yes, within three or four weeks there has been a sale made.

Mr. Wittemore: These questions are objected to as they obviously relate to periods of time since the injunction, and the accounting is limited to the period ending with the date of the injunction.

62

Mr. Griffin: If you will admit that you are now selling coils and notched angles for the purpose of being assembled on the job by the contractor we will not require to examine this witness further.

Mr. Wittemore: I have been called into this case only yesterday, on account of the engagements of Mr. Johnston, who is handling this case, and I am not prepared to either admit or deny Mr. Griffin's proposed statement. I can say, however, that the company will be glad to furnish Mr. Griffin with exact information as to what it is now selling, and if he believes that its present product constitutes an infringement of the patent he, of course, has his remedy by contempt proceedings.

63

Q76. Is it your custom at the present time to sell coils and notched bars to any contractor

that comes into the office and desires to buy them? A. Why, yes, sir.

Q77. Down to date? A. Yes, sir.

Q78. Could you give me the names of any contractor to whom you have sold coils and notched bars within the last two months? A. The Turner Construction Company—wait just a minute, I am not sure; you said coiled wire and notched angles, you didn't call them spirals, did you?

Q79. Coiled wire or spirals? A. It has been coiled but not made up, that is, it is field as-
65 sembled; it is the coiled wire and the notched angles.

Q80. They have been sold to the Turner Company? A. Turner Construction Company.

Q81. What other company? A. We sell so few of them; you see the line I am most interested in is the bar end of the business.

Q82. Is there any other person in the company more interested in the spirals? A. I don't think so; spirals are a side issue with us; bars are the big end of the business.

Q83. Do you know what is being done in the
66 other offices, with respect to spirals, how many are being sold? A. No.

Q84. Have you been in any other office recently? A. No, sir, not within three years, maybe four years.

Q85. Can you give the name of any other company than the Turner Construction Company to which these spirals and notched angles were sold? A. Oh, if you ask me about bar orders that would be one thing; when you come to spiral orders, those are so few and far between

it makes me think. We got an inquiry the other day, I think the Republic Fireproofing Company, my recollection is we sold them a very small order, just what the punch was I don't know; from recollection it amounted hardly to a ton.

Q86. Any others? A. I would not want to say, there may have been others.

Q87. You think there were? A. I don't say I think there were, I say there may have been others, there possibly were, I don't know.

Q88. Is there any other person in the office in which you are engaged in selling spirals and 68
notched angles? A. Just simply selling spirals?

Q89. No, any other person than yourself selling spirals? A. They don't sell any great quantity, they do sell them; I don't know as they would know anything more about it than I do, it is more a matter of record, it might better be a matter of record than memory.

Q90. Who else has sold some spirals and notched angles besides yourself? A. I don't know that you would say I have sold them myself, the order was sent in to the company and 68
came to my desk, and I saw that it was put there; I don't go out of the office to sell at all.

Q91. Where did you say the plant for making the spirals was located? A. Camden, N. J. and Youngstown, Ohio.

Q92. What street number, where is the location? A. I don't know, I could get there, I have been there once and know how to get there,

70 *R. W. Barbour—For Plaintiff—Direct.*

but just what the street address is I couldn't say.

Q93. Have you any idea of the proportion of set up spirals to knocked down spirals and notched angles sold, I mean spirals connected to notched angles, and spirals unconnected but sold with bars for connection in the field? A. As I said, any so-called spiral that is used in New York City or within a radius of 25 miles of New York has to be shipped field assembled.

Q94. Then most of the spirals sold in New
71 York were for field assembly? A. Yes, it was; it couldn't have been anything else because the contractors would have had their jobs held up.

Q95. I will hand you a bar, or angle I should say, and ask if that is the form of an angle that is produced by your company for the support of spirals? A. At the present time, you mean?

Q96. Yes, at the present time?

Mr. Whittemore: I hardly think this witness is qualified to answer.

The Witness: I am not.

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Q97. Don't you know the character of angle—do you know whether that is the character of angle bar produced by your company? I don't mean to say I want you to identify this bar as being a bar produced by your company, but there is no difference between this angle and the angles produced by your company for the support of spirals, is there? A. You mean produced at the present time?

73

Mr. Whittemore: Objected to on the ground that the witness is not qualified to answer.

Objection overruled.

Exception.

A. I know that there are slots made in the angles—you said what we were making at the present time?

Q98. Yes, making at the present time? A. But I don't know, truthfully, what kind of slot we are making now; I know we are slotting the 74
angles; those details don't interest me at all.

Q99. Is this such a slotted angle as your company has made in the past, during the period of this accounting? A. You want a definite answer one way or the other and I don't know whether I could say it was just exactly as we used to slot them; in a general way it might be. I don't see how I am qualified to answer that question, I have nothing to do with the manufacture of that material, I don't know the details, I am a salesman.

Q100. Have you ever seen the bars, you have 75
some in your office? A. We have them in our show rooms, reception room; I don't spend much time out there, though.

Q101. You have seen the goods you sell, have you not? A. Well, I have seen a Havemeyer bar; you ask me about a Havemeyer bar and I will tell you about it from one end to the other.

76 *R. W. Barbour—For Plaintiff—Direct.*

Q102. You said there was no one in the office who knew more about it than you? A. I said in the selling, I didn't say the manufacture.

Q103. Who is more familiar in the New York office with the manufacture, or in any place? Does Mr. Havemeyer know more about it than you do? A. He is the president of the company, I don't know whether he does, he might possibly know more about it, I don't know.

Q104. Can you not give me the name of anyone from whom I can get some information,
77 who knows more about it? A. I suppose the men down in the shops would know more about the way they were slotted, the angles, than possibly anybody else.

Q105. Coming back to this angle again, isn't that angle slotted similar to the way your company has been slotting angles since 1916 down to date?

Mr. Whittemore: Objected to.
Objection overruled.
Exception.

78

A. For instance, the only spiral that I have ever seen—

Q106. I am not asking about the spiral? A. This is an answer to your question—the only spiral I have ever seen excepting about four years ago, when I was in the Camden shop, and I don't remember the details of that spiral at all, is a spiral that I saw once on a job, and I couldn't say whether it was slotted exactly as this angle is or not; it was slotted, and pos-

79

sibly—I couldn't say; as a matter of fact I don't think I am qualified to testify. I am willing to say, if I knew positively that we had slotted angles in just that manner, I could swear it was slotted just exactly as that is, you can be sure I would say so.

Q107. I ask if there is any difference between the slotting of this angle and your own—not that it is your own?

Mr. Whittemore: The question is the same oppositely worded.

80

A. You say that the angle we are making at the present is like this, whether or not it is like this, that the question?

Q108. At the present time, or from August 16, 1916, down to date? A. At the present time I don't know, I haven't seen a slotted angle turned out.

Q109. Have you at any time during that period seen slotted angles? A. Yes, I have, and it had a slot.

Q110. Substantially identical with this one, as near as you can tell? A. Well, I should say so, yes; it was slotted similar to this.

81

Q111. You have some slotted angles in your display room in your office at 42 Broadway, have you not? A. We did have some, whether they are still there I don't know. As I said, I don't spend much time in the display room.

Q112. How do those spirals and slotted angles compare with this slotted angle? A. You mean the one that is in that display room?

82 *R. W. Barbour—For Plaintiff—Direct.*

Q113. Yes? A. I don't know that it is there; I have walked by that display room a few times in the last three or four weeks, but I don't think I have stepped into it. It is just a kind of little space off the hall, and I haven't looked at the spiral, so truthfully I don't know whether it is there or not.

Q114. Will you examine the exhibit that is to be supplied here, and which was previously in the record in this case, and identify it so that we may stipulate the next time we are in court that
83 you do identify that particular spiral? A. In a general way it is possibly slotted as this angle is slotted.

Q115. Who in your company is more qualified to explain to us about the operations of the company in spirals and slotted angles? A. You mean the manufacture?

Q116. Any part of it, manufacture or sales: I am particularly concerned with sales? A. In the sales end of it, from the New York office I probably know as much about the spiral sales as anyone.

84 Mr. Griffin: I ask to have this exhibit marked.

It is marked Plaintiff's Exhibit 1 for identification of this date.

Q177. What differences do you note between the angle before you and the slotted angles put out by your employer since August 16, 1916, to date?

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Mr. Whittemore: Objected to unless the dates are definitely fixed.

Objection overruled and exception.

A. As I said before, I don't think I am qualified to answer that, because I don't really know how they are changing the angles at the present time.

Q118. But you do not notice any differences? A. I don't see them.

Q119. You don't see any difference? A. I don't see the angles.

86

Q120. As far as you know there are no differences? A. No, sir, I would not put it that way; I don't think I am qualified to answer.

121. Do you know of any differences, if you do please state them? A. I don't know that there are any differences and I don't know whether there are or not.

Mr. Whittemore: In view of certain discussions between counsel and the Master off the record, I will advise Mr. Griffin of the structure which the Concrete Steel Company is now selling, without however, waiving any rights of objection as to relevancy and materiality, or the propriety of investigating such structure on the account.

87

Direct examination finished.

Adjourned to October 14, 1919, at 10:30 a. m.

88 *Harry T. Bahr—For Plaintiff—Direct.*

New York, October 14, 1919,
at 3:30 p. m.

Before: WILLIAM PARKIN, ESQ., Master.

Met pursuant to adjournment.
Present, Mr. Edwards and Mr. Johnston.

HARRY T. BAHR, being duly sworn and examined as a witness for plaintiff, testifies as follows:

89 By Mr. Edwards:

Q1. You are the Harry T. Bahr who verified the report in an affidavit dated the 22nd day of September 1919, are you not? A. Yes, sir.

Q2. And you prepared the report annexed to that affidavit? A. Together with my assistants.

Q3. It was done under your supervision? A. Yes.

Q4. Just what does this report cover? A. It covers all of the orders on spirals, as submitted to me by our order department.

90 Q5. Just explain a little more fully what that means, spirals attached to the reinforcing, or not attached. A. I don't know anything about the mechanical end at all. I was given a schedule of all the spiral orders that I was to render an accounting on.

Q6. Then you cannot explain whether these orders cover spirals attached to angles or not? A. No.

Q7. They may or may not have been, as far as you know? A. For all I know.

Q8. Who can tell just what these reports cover? A. I don't know.

Q9. Is there anyone at your office who has any idea as to what structures are covered by this report? A. I imagine Mr. McGee, he is the secretary; he is the one under whose direction I got up the schedule.

Q10. And he could take the order number and from it identify the kind of spirals that were sold? A. I believe he could. 92

Q11. Have you any catalogues or other literature which will show just what each order covvers? A. That I don't know.

Q12. Do you know the kinds of spirals sold by your employer? A. A spiral is a spiral to me.

Q13. And you do not know how they are held in place? A. No.

Q14. You recollect getting up the statement showing the profit and loss on spirals? A. Yes, sir.

Q15. You recollect that at an earlier date you got up a cost sheet showing the cost of spirals? 93 A. Yes, sir.

Q16. Will you tell me how the various items in the first report can be identified with the corresponding items in the second? A. The cost sheet is made up on the basis of shipment, and as we did not have the cost on each shipment we had to combine the costs on each order to get the total cost of that order; that is why the cost is blank; that is included in some other item.

94 Q17. The cost is given in the cost sheet supposing you illustrate by taking the first item in the profit and loss sheet and the first item in the cost sheet, and state whether or not those items correspond? A. On this schedule (indicating cost sheet) we have itemized the cost on each shipment; on the profit and loss sheet we have shown only the total cost. On the first item you will see the total cost, $10.21, on the profit and loss, and $10.21 on the cost.

Q18. So these two items correspond? A. Yes.

95 Q19. And the same is true of the second item, is it not? A. Yes.

Q20. How about the third item; as I understand it there is no correspondence? A. Because that on the profit and loss sheet is included in the total cost of an order, whereas on the cost sheet it only represents the partial cost.

Q21. So as to the third item there is some confusion, and one could not understand just how one matches up with the other? A. The way to combine these costs is to have the order number so as to get the cost on here (indicating profit and

96 loss sheet). In order to obtain the cost as shown on the profit and loss sheet, in some instances you have to make a combination of cost on the cost sheet, because they only represent the cost of shipments, which may be partial and not complete. Take the third item on the profit and loss sheet, we have two dates there, the 22nd and the 16th; that means there were two shipments made, and the same way with the next item, shipments made on the 16th, 23rd, 29th and September 14th,

so that the cost on the profit and loss sheet would be the total cost of the order.

Q22. Turn to the next sheet and explain it as to the third item? A. This represents the cost of the shipment.

Q23. Each day? A. Whenever the shipment was made.

Q24. And it is not collected according to order number? A. Yes, that is right, whereas on the profit and loss sheet the cost is collected according to order number, although there may have been half a dozen shipments, you see, on each 98 order.

Q25. Can you give us a statement which will show the cost of each order according to the profit and loss sheet? A. It is already shown on this statement, the profit and loss sheet, that is what I have already given.

Q26. You have given the total but not the itemized cost which appears on the cost sheet. The trouble is that as to a great number of items it is impossible for me to identify the cost sheet with the profit and loss sheet. A. I can do that, yes.

99

Q27. I wish you would substitute that for the cost sheet, to be used in lieu of that, or in addition to it, then we can make something out of it. A. In other words, you want an itemized profit and loss sheet?

Q28. By order number, that matches up with this, yes? A. Yes.

Q29. I note that as to several items there is a cost charge on the profit and loss sheet, but no selling price, as for example, order CN 5005, under date of December 5, 1916; will you please

100 *Harry T. Bahr—For Plaintiff—Direct.*

explain that? A. I will tell you, that may represent a shortage which we could not bill out.

Q30. Have you any other explanation to give? A. No.

Q31. I ask you to look over the sheet and note that such discrepancies occur several times; is this the only explanation you have? A. At the present time, without looking it up.

Q32. Then these spirals were never given away? A. No.

Q33. I call your attention to the item attached
101 to your affidavit under date of July 29, 1919; how did you determine that item, interest on the capital invested? A. I took the period for which the accounting was to be made and totaled up the capital stock and surplus of the company by months for that period, struck an average, and then ascertained the ratio of spiral sales to the total sales of the company and took that proportion of the average capital.

Q34. What was that proportion? A. I don't recollect; you would have to figure that back on the basis of the interest which is at 6%.

102 Q35. Will you kindly give us the exact figures so we can check that up? A. I will give you that at some other time.

Q36. When you furnish the other report at a later date? A. Surely.

Q37. Can you determine as to which orders the spirals were shipped attached to the spacing angles, and as to which orders the spirals were shipped separately from the spacing angles? A. No, sir.

Q38. Is there no way of determining that from the records of your company? A. That I don't know.

Q39. Will you find out and report as far as you can? A. Yes.

Q40. If you can give me the information please let me know what was sent each way, that is in bulk? A. Yes.

Q41. You understand that when I ask you to do anything it is satisfactory if any competent officer of your company does it, we ask for no duplication; if any request overlaps any request 104
of Mr. Barbour the plaintiff will be entirely satisfied with one compliance? A. Yes.

Mr. Edwards: I request that Mr. Barbour produce the information requested at page 14 of the record, and I will state that this witness need not bother with the same as long as Mr. Barbour does it; that does not apply to the cost sheet by order number.

Q42. Returning now to the cost sheet, I notice 105
that you have under the first item the material cost; what does that mean? A. It represents the cost of material.

Q43. That is the iron that goes into the order? A. The basic cost.

Q44. Then what does the item labor include? A. The direct labor.

Q45. That is, the man who punches out the bars. A. Direct labor represents the labor that can be directly allocated to the product.

106 *Harry T. Bahr—For Plaintiff—Direct.*

Q46. And that in this instance would be the slotting of the bar? A. Whatever it may be.

Q47. And the joining of the bar to the spirals, where the bar is joined to the spirals? A. I should say so.

Q48. What is manufacturing overhead? A. That represents the indirect expenses applicable to that proportion of direct labor.

Q49. How do you separate that item from general overhead? A. We keep our factory overhead separate from general overhead; we don't
107 merge all the overhead; we have a separate factory and it is easy to collect all the indirect expenses of that factory.

Q50. And that is what is included in manufacturing overhead? A. Yes, sir.

Q51. Nothing but what belongs to the manufacturing expense? A. That is right.

Q52. If you have bookkeeping, etc., for nothing but factory, that goes in to the factory overhead? A. Yes.

Q53. What does the selling expense include? A. Cost of selling the spirals, and that is arrived
108 at by taking the ratio of the selling price of spirals to the total selling price of all products, and taking that percentage of the selling expense.

By the Master:

Q54. In that connection how is the manufacturing overhead arrived at, is that on the proportion? A. On the basis of direct labor.

Q55. Direct labor as compared with the total direct labor? A. Yes, sir. I would like to cor-

109 rect that, the selling expense applicable to spirals was obtained by taking the tonnage of spirals as compared with the total tonnage of all products, and taking that percentage of the total selling expense.

By Mr. Edwards:

Q56. Would the value of each ton of your various products be about the same? A. No, spirals would be higher, so it is to your advantage.

Q57. That is, bars cost less than angles? A. 110 I do not know.

Q58. Then you do not know the tonnage value of bars as compared with the tonnage value of angles? A. No.

Q59. You just assumed, however, in estimating this selling expense that a ton cost the same whether it was made up into angles or spirals or bars, is that right? A. I didn't assume anything; I took the total selling value of the spirals, which is shown on the bills that we render to our customers, and that in every case is higher than a ton of bars; what you are doing is split- 111 ting up the spirals, you are taking the spacers as a separate item. To me a spiral is a spiral, whether it has a spacer attached to it or not; the selling price of a spiral without a spacer is greater than the selling price of bars per ton.

Q60. What is included under the item general overhead? A. That represents the general overhead, everything outside of the selling expense and the manufacturing overhead, the labor and material cost.

112 *Harry T. Bahr—For Plaintiff—Direct.*

Q61. That would include officers' expenses and other miscellaneous general expenses? A. Yes, sir.

Q62. On what basis were they applied to each order? A. On the same basis as selling expenses.

Q63. That is by tonnage? A. By tonnage.

Q64. Can you state the proportion of the spiral tonnage to the whole tonnage of the company? A. I can give that later; I haven't that with me.

Q65. Will you please do so? A. Yes, sir.

113 Q66. I show you statement which is taken at random from the profit and loss sheets submitted by you, which is reduced to the per ton basis, and it shows that the cost of steel per ton varied from $840 per ton down to $56.50 per ton; I ask you how you account for these discrepancies? A. I don't know how you account for it; I don't know that statement; I don't know what you have done; on the face of it it is ridiculous.

Q67. It is taken from your report and reduced to the per ton basis; you have given the

114 weight, I believe, as to various items, and the cost of manufacture, and the selling cost? A. You specified material cost, didn't you?

Q68. That is total cost; I have made a mistake, I should have said total cost and not material cost. Can you explain why such a great variation in cost? A. No.

Q69. There should not be any such great variation in cost, should there? A. Well, the cost all depends on the size of the order.

115

Q70. Would any orders run up to anything like $840 a ton cost? A. I could not answer that question without finding out for myself.

Q71. Supposing I give you the paper and ask you to check it up and report whether or not it is correct, at a later date, and if it is correct explain why? A. Yes, sir.

Q72. Will you just state what your duties are with the Concrete Steel Company? A. I am the auditor of the Concrete Steel Company; I have charge of their accounts, and I am also assistant secretary.

116

Q73. And it is your business to keep track of costs, profits and losses, and so on? A. Yes, sir.

Q74. Just from the figures? A. From the figures.

Q75. You do not come in contact with the actual structure sold? A. No, sir, we have plants all over the country, and the reports are made up on these plants and submitted to me.

Q76. And the profit and loss sheet covers the entire country? A. Yes, sir.

Q77. Do you know how many sizes of spiral reinforcers you make? A. Yes, sir.

117

Q78. Do you know whether or not the cost of producing spirals is the same regardless of the diameter of the spiral? A. No, sir.

Q79. Do you know whether or not a ton of spiral costs the same, no matter what the cross section of the wire is, it is only a matter of setting the rollers? A. It is only a matter of diameter of the spiral; surely in a larger spiral there would be more material.

118 *Harry T. Bahr—For Plaintiff—Direct.*

Q80. Per ton it would be the same? A. It all depends on the size of the wire, I should say; isn't there a variation in the price.

Q81. I do not know, is there? A. I am pretty sure there is.

Q82. Any great variation? A. No.

Q83. We can disregard it for the purpose of this accounting, as far as you know? A. Yes, sir.

Q84. Can you have the figures in two weeks? A. I will try my best.

119 Q85. None of the papers submitted by you give the names and addresses of the persons who place the orders? A. No.

Mr. Edwards: I object to the statements for this reason, and ask that the names and addresses of the persons placing the orders be furnished, as required by the Master.

Mr. Johnston: This we decline to do unless ordered by the court. The question has been raised in a large number of cases; only recently, that is within a year

120 past, it was raised before his Honor Judge Hazel in a very important accounting in which the defendants admitted liability for $225,000, and Judge Hazel refused, as did the Master, to order the opening of books to an investigation of that character, and specifically refused to permit us to be forced to disclose our customers' names and addresses. The case was the Safety Car Heating & Lighting Company v. U. S.

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Light & Heat Company, a case arising in the Western District of New York under substantially similar circumstances to this, that is, the Court of Appeals had acted in the matter and sent it back for an accounting.

Mr. Edwards: It seems that some profits have been made out of these infringements complained of by the defendants, and it is altogether likely that other profits have been made by the builders or contractors who used the infringing devices; I cannot tell at this time from the information given as to where the plaintiff must look to recover the profits, and as the defendant is a co-conspirator with the contractor who used the infringing devices in the buildings. I think that the defendant should give the necessary information.

122

The Master: If this is the object I shall deny the motion. You cannot use this suit for getting evidence in another suit.

Mr. Edwards: I give notice on the record that the plaintiff will take testimony in this case in Pittsburgh before a notary public, to be announced later, of Horace R. Thayer and John M. Chester. This testimony will be taken at the office of the Clerk of the United States District at Pittsburgh, Monday, October 20, at 10 a. m.

123

124 *Bruce Clark White—For Plaintiff—Direct.*

Mr. Johnston: I am in daily attendance on the Court of Appeals, I do not believe I can be in Pittsburgh on the 20th as I think my case will be reached on that date.

Adjourned to November 5, 1919, at 10.30 a. m.

New York, October 23, 1919.

125

Met pursuant to adjournment.
Present as before.

BRUCE CLARK WHITE, being duly sworn and examined as a witness for plaintiff, testifies as follows:

Q. What is your address, Mr. White? A. 31 West 12th Street, New York City.

Q. Your age? A. 60.

126 Q. What is your occupation? A. Mechanical engineer.

Q. How long have you been so engaged? A. 40 years.

Q. Have you had any experience with re-enforced concrete? A. I have.

Q. With what company? A. Principally with the Monolith Company whose principal offices were in Washington, D. C.

127 Q. And where was the work with them done? A. Those works were at Colonna, Pennsylvania, about 25 miles west of Pittsburgh.

Q. Have you examined the records in the case of Vandenburgh against Concrete Steel Company and in Vandenburgh against Electric Welding Company? A. To some extent, yes.

Q. Have you also examined the Building Code of New York with respect to the requirements for re-enforcing concrete columns? A. I have.

Q. And what would you say with respect—

128 can you give the requirements as to the securing of spirals to the longitudinal re-enforcing recited in that law? A. The law provides that the hoops or spirals shall be rigidly secured to at least four verticals to insure uniform spacing (new).

Q. What practical means were known in this country for securing spirals to the spacers for concrete re-inforcing, beginning with August 16, 1916, down to July 1, 1919, open to the public, to your knowledge? A. I know of none except the old method of wiring spirals to the vertical bars.

129 Q. Do you know of other methods of securing the spirals to the vertical bars? A. There are other patented methods consisting in some form of special clip or in the case of the Monolith system, staples pinched into grooves in the vertical bars and closed over the spirals.

Q. What have you to say with respect to the value of the Vandenburgh method of securing the spirals to the bars as against any other

130 *Bruce Clark White—For Plaintiff—Direct.*

methods that you know of? A. I consider such a method of great utility and great value.

Q. Are you familiar with the Cummings patent, 822,587, which shows separate rings secured to the longitudinals by means of spurs on the longitudinals? A. In a general way, yes.

Q. What have you to say with respect to the value of the substitution of spirals for the separate rings shown in that patent, as shown in the Vandenburgh patent? A. The spiral as compared with the separate ring is of course very
131 much more practical in that the separate ring system of hooping columns is not a practical method at all as it is expensive, difficult of manufacture and assembly, and is very much weaker than the spiral hoop system.

Q. With respect to all the present known methods of re-enforcing concrete columns, do you consider the Vandenburgh method of securing the spiral the best or the worst, or what is your judgment with respect to its position in the art? A. The Vandenburgh method in which the spur of the vertical column member itself is closed over the spiral hoop by the blow of a
132 hammer is in my opinion the most valuable and practical method of rigidly attaching the hoops to the vertical bars that can be conceived.

Q. And do you know whether or not that complies with the building requirements as to the rigid fastening called for? A. That complies exactly with the requirements of the ordinances of the City of New York, for instance, which also largely obtain in all the other large cities of the United States.

Mr. Johnston: The answer is objected to as stating a conclusion of law, and therefore incompetent.

Objection overruled.

Q. Have you personally made use of the re-enforcing shown on page 392 of the Electric Welding Company record, heretofore referred to in this case? A. Page 392 illustrates a form of re-enforcing, or of column re-enforcing comprising both hoops and spirals stapled and attached to Monolith bars. Only the spiral form 134 has been used, the other part of the illustration being only to show the general adaptability of the Monolith stapling, but not to my knowledge ever used.

Q. Have you ever made use of the wired on staples personally? A. If you refer to the old-time method of securing the wires to the columns —I mean the spirals to the columns by twisting wire about the tip, I have never used it personally nor seen it used in any practical way.

Q. Do you consider that the wiring on could ever be as good as the Vandenburgh method? 135

Mr. Johnston: That is objected to as leading.

Objection overruled.

A. It could never be as good.

Q. State why? A. For the reason that it does not give an absolutely rigid attachment of the spiral to the bar or prevent the endwise slipping of the spiral upon the vertical bar. It is

also difficult to accurately space the spirals to get the very best effect and is a slow and expensive method of assembling either in the shop or field.

Q. Have you as a mechanical engineer gotten any estimates on the cost of wiring on the spirals and of securing the spirals by the Vandenburgh method, that is comparative costs? A. In a general way, yes.

Q. What do you estimate the cost of wiring on the spirals to be for a column we will say
137 having spirals 2 feet in diameter and containing roughly half a ton of material and made up of half inch wire rod? A. That will naturally vary some in locality and efficiency of shop management or field supervision, but my conclusion is that it might amount to $15 a ton.

Q. And what would you estimate the cost of securing a similar spiral by the Vandenburgh means? A. That would be a mere fraction of the above figure, perhaps amounting to $1 a ton or not to exceed that.

Q. Could you not give a more careful esti-
138 mate of the cost of wiring on, that is do you think it would be $15 a ton, or more or less, that is making a more exact estimate? A. I could hardly fix the figures any closer except I had an exact layout of column bars; pitch of spiral, size of members, etc., in fact every particular that would affect the cost.

Q. Assuming a column 20 feet high with ½ inch spiraling, spaced 3 inches apart and the spiral 2 feet in diameter and having the spiral

secured as required by the Building Law, what would you say the cost would be if hand-wired and if secured according to the Vandenburgh method, eliminating the cost of the steel and delivery? A. Is this to be field or shop assembly?

Q. Field assembly. A. I assume that the method in the case of the hand-wired column would be that the bars and spirals are shipped to the building and are wired on according to the building laws, securing every coil to each of 4 vertical bars to which they are to be attached, and that the method employed consists in wind- 140
ing a coil of soft wire about both bars and spirals to secure the spirals in vertical position, and also to secure the bars in lateral position in relation thereto, the security being sufficiently rigid to prevent the misplacement of either vertical or spiral members when the concrete is poured. Such a column re-enforcement as inquired about would require 4 coils per foot of length or 80 coils or turns for the column, and if security is made to each of 4 bars for each coil, there will be a total of 320 wirings called for per column. Two men will be required at least 141
and from such experience as I have had in work of this kind, I should say that it would entail a cost of $10 per column. Now as the assembled part of such a column would be about 500 pounds, my estimate would be that the cost per ton would be approximately $40 for the assembled part alone. Such a column would have perhaps a total weight of a ton, therefore the cost per ton of assembled column re-enforcing would be

142 *Bruce Clark White—For Plaintiff—Direct.*

about $10. In the case of a column re-enforcement according to the Vandenburgh system, the spiral would be bent cold to suit the specification and the bars to which the spiral is to be attached would be received from the mill notched or kerfed, and a shop assembly would combine the spirals and 2 of such bars in a collapsible form to expedite hauling and shipping and at the building this structure or partial structure would be straightened up and the other two bars required by the building laws would be dropped
143 into place, in a few minutes time the operators could hammer down the spurs of the kerfs on to the remaining joints or spirals, thus completing the column re-enforcement. Such an operation might consume the time of a couple of men for half an hour or a total of perhaps an hour for a column of such dimensions as inquired about. This would be about 10 per cent of the cost of a wired column such as first described, in which resort is had to a wire wound about the different members. The column inquired about is longer than the average re-enforced column, which is about 14 feet ordinarily. It is probably
144 larger and heavier than the average of such columns, so that in estimating the costs of average columns, the time consumed would not vary much from the above, but the weight would be considerably less and would add to the cost per ton, by which I mean to say that the cost per ton of such a column as inquired about is probably the minimum for such work. Your question assumed field assembly entirely. Should this be

145 the case, there would probably be some extra cost above that of my estimate, as field assembly never can be done as economically as shop assembly. There might, however, be some freight and handling charges which would offset the above, and the difference would not be great in any case. I will therefore let my estimate stand for a complete field assembly.

Mr. Johnston: The answer is objected to because it is irrelevant. The defendant in this case is a manufacturer of iron 146 work, is not engaged in building re-enforced concrete construction. The savings which are made in that construction therefore do not relate to defendant's profits and have no bearing upon the account which it has filed.

Overrule the objection for the present.

Q. How do you arrive at the cost of the wired on joints of the spirals and longitudinals? A. By estimating in my mind the probable time that would be consumed in such work, based 147 principally upon my experience in having various kinds of such work done. Of course all such estimates are subject to check in actual performance.

Q. Have you estimated the labor cost and wire cost separately, that is the quantity of wire required? A. I made such a figure as would cover the extra cost of the wire necessary to cover the wiring, which is a relatively small matter as compared with the labor cost.

148 *Bruce Clark White—For Plaintiff—Direct.*

By Mr. Edwards:

Q. You compared the cost of partial shop assembly as to the patented structure with the wiring on the job as the old prior art method, will you please state what would be the cost of using the patented method on the job? A. My estimate of the assembly under the patent was partially shop and partially field assembly, but as I have already stated the difference would not be important if it were all field assembly,
149 especially in view of reduced cartage and wiring in the latter case. In the case of the wire I assume it to be wholly a field assembly. Of course, costs vary with the extent of the work and the amount of organization permissible and also upon the employment of handy apparatus to expedite such assembly, which might not be warranted in a small contract, but would be important in a very large one. To get at anything relatively close in these calculations, one must have an exact lay-out of the whole contract to be executed.

150 By Mr. Griffin:

Q. Considering a sufficient number of bars only to comply with the building requirements, such bars for example, to be four of those that I now show you, plaintiff's exhibit No. 3, defendant's device, heretofore filed in this case, what would you say a fair royalty per ton for the spiraling and four such bars would be, con-

151 sidering your previous statement for an average sized column? A. In view of the conclusions expressed in my previous replies, and the assumption that the conditions set forth in the questions would obtain ordinarily my opinion is that a royalty of $12 per ton would be fair and equitable.

Mr. Griffin asks and insists that the case be heard upon cross-examination at the earliest possible date and that a definite date be set for such hearing.

152 Mr. Johnston: As Mr. Griffin is not in town and the matter must be left with Mr. Edwards in any event, I cannot see that his wishes should influence the Master further than that of course the Master desires to expedite the case. Some consideration must be given my appointments. I have been pressed I think a little unreasonably in view of my engagements in the Court of Appeals at the present time and I have come at times when I should have been doing other work. This is only one of a number of cases in

153 my charge and I cannot be required to turn them over to other parties to be conducted.

Adjourned to Friday, October 31, 1919, 10 a. m.

154 *Bruce Clark White—For Plaintiff—Direct.*

New York, October 31, 1919.

Met pursuant to adjournment.
Present as before.

Mr. Edwards: I wish to bring out a little more fully the qualifications of Mr. White.

The Master: I will let you ask the questions.

Mr. Johnston: I object to the action of the master in permitting the reopening of the deposition, a week after it has been closed, for the
155 purpose of patching it up in a respect in which counsel believes it to be defective.

Mr. Edwards: I note on the record that the direct examination of this witness has not been closed.

BRUCE CLARK WHITE resumes the stand:

By Mr. Edwards:

156 Q. Please state what experience you have had with re-enforced concrete? A. I was chief engineer and superintendent for two years or more, off and on, for the Monolith Steel Company of Washington, D. C., and designed apparatus for their various concrete steel re-enforcement systems, I designed the section of the Monolith bar, made estimates of the cost of various steel work

for concrete re-enforcement; engaged the help, looked after the accounts, correspondence, contracts, shipments, etc. I am familiar with building constructions of various sorts, having served an apprenticeship to a firm of architects in Chicago, finally becoming foreman of the office.

Mr. Edwards: Direct examination closed.

Cross Examination by Mr. Johnston:

Q. Who makes the added profit from Vanden- 158
burgh construction, assuming that there is one, according to the figures which you have given, say on page 48; I mean by my question does the manufacturer of the ironwork make the profit or does the contractor who erects the building make the profit? A. I don't know.

Mr. Johnston: Master, so far as the present witness is concerned, it is obvious that his deposition, no matter what his qualifications may be, is incompetent for want of knowledge. If he cannot tell who 159
made the alleged saving in cost, his deposition would have no bearing on proper royalty for the manufacture of the ironwork paid.

The Master: It may be only one step in the proof, Mr. Johnston; that may be supplemented.

Mr. Johnston: Very well, sir, I will simply reserve my objection to the depo-

sition as wholly incompetent, and irrelevant, in view of the witness's last answer, leaving the Master to pass on it when he makes his report.

Q. What is the average profit which a manufacturer of ironwork makes on a ton of concrete re-enforcing? A. I found that this varied enormously in the size of the contract, the unit size of the bars and the price of steel and the price obtained for the concrete re-enforcement. It was
161 sometimes very small, to the point of disappearing on some small contracts, and on large contracts it was a relatively large profit amounting in some cases to half the contract price.

Q. Mr. White, is it not possible for you to give some figures for the Master's guidance, for example, you say that on small contracts the profit may disappear, and I understand it to be a fact that on very small lots the ironwork may be supplied at a loss for business reasons, but your upper limit is not given in figures at all. About what in dollars per ton would be a fair average
162 profit, and about what in dollars per ton would be a substantial maximum profit on a contract of reasonably large size? A. At the time that I was engaged in the production of concrete re-enforcement, I recall some contracts in which we obtained about $60 per ton gross for the steel and in such a case there were profits at times of a half of this price, or $30 per ton, exclusive of the engineering cost. I refer now to what were known as shop profits.

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Q. What was the date of the work to which you referred in your last answer, of course I mean approximately? A. This work was executed in 1908 or 1909 as I recall it.

Q. Your shops did not make the steel but fabricated it, if I understand the situation, is that right? A. That is right.

Q. Do you remember the price which you paid for the steel, of course approximately? A. The base price on bars as I recall it ranged from $24 to perhaps $28 per ton during that time. I recall that it fluctuated considerably. By the base 164
price I mean a price for a certain section of bar based upon a certain percentage of carbon. Other sizes of bars and other percentages of carbon would change the price.

Q. 1908 and 1909 was about the time when re-enforced concrete work began to be extensively used, was it not? A. Yes, although it had been extensively used previous to this time, its use was growing while I was in the business.

Q. Are you familiar with the base price of steel at the present time, say for the past 2 years? A. In a general way, yes.

Q. Please state for the Master's information, 165
about what the fluctuations have been and we will say since the middle of 1916? A. In 1915—may I go back to that—

Q. Yes. A. The published price of steel rods for instance, such as would be used for spiraling a re-enforced column, was about $30 base. In 1916 the price advanced to $55 and by October of that year to $60 and in the following year it was

166 *Bruce Clark White—For Plaintiff—Re-direct.*

quoted as high as $85 per ton. It dropped back during the last year or 18 months to $57, I do not know the present quotation.

Q. What is the average percentage of profit on the turnover in a factory which buys its iron or steel and turns it into a fabricated product—can you answer that question? A. I would not say what it is. It would doubtless vary a great deal in different shops under what might appear to be similar conditions.

Q. What royalties have you paid for re-en-
167 forced concrete steel, Mr. White, in the work which you have yourself done? A. If you mean by royalties, amounts paid to the holder of a patent, we never paid such royalties, as the Monolith Steel Company owned the patents under which it operated.

Q. Have you personal knowledge of the payment of any royalties, as royalties, that is payments to the owner of a patent right for the use of any steel re-enforcing for concrete? A. I have no such personal knowledge.

168 *Re-direct Examination by Mr. Edwards:*

Q. You have been asked as to whether the fabricator of the metal going into re-enforced concrete or the contractor makes the profit where the Vandenburgh invention is used, and I believe your answer was that you did not know. Assuming this to be the case, does it make any difference as to what would be a fair royalty to the inventor as to who makes the profit?

169 Mr. Johnston: Objected to as incompetent, the witness has stated that he did not know. No proper answer can be based on lack of knowledge. The question is also objected to as requiring the witness's opinion upon a question of law; one of the things which the Master will have to determine is whether that makes any difference.

Objection sustained.

170 Q. When you stated what in your opinion would be a reasonable royalty to the inventor for the use of his invention, did you take into consideration whether the royalty should be paid by the fabricator of the re-enforcement or by the contractor who used the same? A. I did not.

Mr. Edwards: Re-direct examination closed.

Mr. Johnston: Signature waived.

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IN THE
DISTRICT COURT OF THE UNITED STATES,

FOR THE SOUTHERN DISTRICT OF NEW YORK.

GEORGE E. VANDENBURGH,
Plaintiff,

vs.

CONCRETE STEEL COMPANY,
173 Defendant.

TESTIMONY

of

HORACE R. THAYER, a witness produced on behalf of plaintiff, before J. Wood Clark, Esq., Clerk of the District Court of the United States for the Western District of Pennsylvania, pursuant to notice served on Defendant's solicitors, at the office of said J. Wood Clark, Esq., on Monday, October 20, 1919, at 1:30 o'clock P. M.
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APPEARANCES:

For Plaintiff: EDWARD A. LAWRENCE, Esq.

For Defendant: THOMAS J. JOHNSTON, Esq.

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HORACE R. THAYER, having been duly sworn, deposes and says as follows, in answer to questions by Mr. Lawrence:

DIRECT EXAMINATION.

Q1. State your name, age, residence and occupation. A. Horace R. Thayer; forty-six years of age; my residence is Pittsburgh, Pa.; my occupation is civil engineer.

Q2. What specialty, if any, do you follow in civil engineering? A. Structural engineering.

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Q3. You are, I believe, assistant professor of designs at the Carnegie Institute of Technology? A. I was at that time. I am now associate.

Q4. When were you? A. I was at the time I testified there, but I am now associate professor of structural designing. My title has been promoted since then.

Q5. What experience have you had with re-enforced concrete? A. I have been in contact with it since about 1907, more or less. A little before that concrete had been coming into use to some extent, and I had discussed the matter, but my first real experience in design work was

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in working up some re-enforced concrete arches in about 1907 or 1908. I have done quite a little bit of work in re-enforced concrete since that date. I taught it, and practiced it on the outside.

Q6. Were you at one time a member of the faculty of Lehigh University? A. From 1903 to 1906.

178 *Horace R. Thayer—For Plaintiff—Direct.*

Q7. You are the same Horace R. Thayer who testified as an expert in behalf of the plaintiff, in the case of George E. Vandenburgh vs. Electric Welding Company? A. Yes, sir.

Q8. In the District Court of Western Pennsylvania? A. Yes, sir.

Q9. Are you familiar with Vandenburgh Re-Issue Patent No. 14,182, the patent in suit in this case? A. I have examined it very carefully.

Q10. And it was on this patent that you gave expert testimony in the suit in the Western Dis-
179 trict of Pennsylvania? A. Yes, sir.

Q11. What is the nature of the means by which the wire spirals are shown in said patent, as connected to the longitudinal bars? A A small hole, a recess, is punched in the edge of the bar and the latter in inserted through the slot, and it is then pounded tight against it.

Q12. You refer to what is termed in this patent as the spurs 9? A. Yes, sir.

Q13. What other method of attaching spiral wires to longitudinal bars in this character of concrete re-enforcement are you familiar with? A. Well, there are three general types. There
180 is the Cummings method of riveting, and the old-fashioned method of wiring, both of which are practically out of date, and there is one method in common use at the present time which is substantially the same as we have been just discussing; that is, the fastening of the spirals in recesses in the main bar.

Q14. By bending a spur over the spiral? A. By bending a spur over the spiral.

Q15. What advantage is there in the use of this intergral spur, bent over the spiral to hold it in place, over the method of riveting or the method of wiring? A. The method of wiring uses up a good deal of the section of the bar. It was wasted in that way, and riveting is also expensive. The advantage over the wiring method is two-fold. The Vandenburgh method can be collapsed for shipment, and then when it is set up the bars are rigidly held in their proper position. This is very important, because a small displacement of the spirals from their correct position would mean a serious weakening of the concrete column, and this is quite likely to occur when they ram down the concrete.

Q16. In other words, do you mean that the spirals by the Vandenburgh method are always kept in their proper spaced relation? A. Yes, sir. They cannot alter their relative position without the application of a very large force.

Q17. This is not true of the wired method? A. No, sir; unless it is done on the field, right in the field, it is quite likely to be displaced.

Q18. Is it quite likely to be displaced even when done on the field, when the concrete is afterwards rammed around it? A. Well, I wouldn't think that it ought to be if it were fixed up as I have figured it later on, that is, this price of thirteen dollars per ton that I figured it, I would

think that would be a reasonably sound engineering construction.

Q19. Where would the attachment of the spirals to the longitudinal bars be affected in the Vandenburgh method? I mean at the factory or in the field? A. They are attached in the factory. They are shipped in a certain form, altered slightly and set up in the field, but the field operations are comparatively simple.

Q20. Is it not true that the Vandenburg reinforcement is rammed by clinching the spirals
185 to the bars at the factory, and the reinforcement is then preferably collapsed and shipped in the collapsed position, and then need only be extended when put in place in the field A. I believe that statement is practically correct. As I remember, the fastening is not clinched in the shop. The bars are left on loose, but it is clinched when it is set up. In order that it may be collapsed, the bars are shifted around to the two opposite sides and then collapsed. Then when it is set up the bars are brought around in the relative position and then clinched tight.

Q21. Is it customary to wire every joint in
186 the wiring method of assembling this character of structure? A. That would depend upon the size that you used. With the heavier bars I would think it might be omitted. With the lighter bars it would be quite necessary. It would depend a good deal on the care that was exercised and on the size of the bars employed. To my mind, for the smaller sized bars every

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joint should be wired to effect the greatest security.

Q22. Do you think that it is practically possible to make the wired structure as efficient as the structure shown in the patent? A. About as good, yes. That is, if you wire every joint I think it would be about as good.

Q23. Do you think a wired joint of two unnotched structures is as good as a joint which is made by bending a spur around the other element to hold it in the recess?

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Mr. Johnson: This is objected to as outside the scope of the Master's inquiry. The question is not what one thing is worth or whether one thing is as good as another. The issue is the actual profit made by the defendant, and the question does not tend to elicit that.

(Question read).

A. I would say that it is not really quite as good, but the wired structure wired at every joint would be good enough.

Q24. Can you give any estimate of the cost of securing the coils in the recesses of the longitudinal bars, according to the Vandenburgh method, as compared with the probable cost of wiring the coils to the longitudinal bars as in the old practice?

189

Mr. Johnston: The question is objected to, first, because an estimate is called for.

190 *Horace R. Thayer—For Plaintiff—Direct.*

The Master's inquiry concerns facts; second, because there are no conditions given, so that the question is too indefinite to furnish a basis for judicial action. Further, whether the work is done in the factory or in the field would have an important bearing upon the witness's answer.

(Question read).

A. I estimate that the cost of punching the bars
191 and fastening them up, the former to be done in the shop and the latter to be done in the field at about three dollars a ton; but this figure would vary a great deal with the size of the bars and their spacing, with the location in which the work was done, with the time in which it was done, whether done now or three year ago. I estimate the cost of wiring up of joints at about thirteen dollars per ton. That again would vary, as the other figure has, with a number of circumstances, but I have tried to give you an average figure for the present time.

192 Mr. Johnson: The answer is objected to as too indefinite to form a basis for any action by the Master.

Mr. Lawrence:

Q25. You think, then, that the comparative cost of the Vandenburgh method of attachment, as compared to the wiring method attachment,

would be substantially as three to thirteen? A. Yes, sir.

Q26. Giving a saving by using the Vandenburgh method, of about eight dollars per ton? A. Well, it would be a saving of ten dollars per ton, plus the saving in freight.

Q27. What, then, would you consider a fair royalty for the use of the Vandenburgh process?

Mr. Johnston: That is objected to as guess-work, and as having no basis upon 194
which to estimate. The Master is required to find what is an existing royalty, and not what would be "a fair royalty."

(Question read)

A. Well, I would think about eight dollars a ton.

Mr. Lawrence:

Q28. Are you familiar with the method of attaching the spirals or hoops, to the longi- 195
tudinal bars by means of a staple clinched to the longitudinal bar?

Mr. Johnston: Objected to as irrelevant.

A. You refer to the spacing bar, do you not?

196 *Horace R. Thayer—For Plaintiff—Direct*

Mr. Lawrence:

Q29. The original bar? A. Yes, sir.

Q30. Can you give an estimate of the comparative cost of this method of attachment, as compared with the Vandenburgh?

Mr. Johnston: The same objection is made.

197 A. It is a little hard for me off-hand to give an estimate of that. I would not think there would be a great deal of difference between the Vandenburgh method and the spacing bar method.

Mr. Lawrence:

Q31. How are the integral spurs of the Vandenburgh method formed—by hand or by machinery? A. They would be formed by machinery.

Q32. Does that contribute to the economy of
198 the method? A. Yes. It would be impossible commercially to get them out by hand; that is, a commercial figure.

Q33. How is the wiring done—by hand or by machinery? A. By hand.

Q34. The wiring of the spirals to the uprights or longitudinals must, I believe, be done in the field? A. If it were done in the shop there would be a great deal of danger of its working loose during transportation and influences to which it was subjected. It wouldn't

be collapsed, and I wouldn't imagine it would stand the ramming that the concrete gets. It must be done in the field, therefore, by hand.

Q35. Then, as I understand you, the use of the integral spur attachment enables the reenforcement to be shipped collapsed, while when wired in the factory, if that were attempted, the reenforcement could not be shipped in a collapsed condition, or if forcibly collapsed, the wiring would not be satisfactory when it was set up? A. Yes, sir. You see, in order to collapse the columns they take the bars and 200 slide them around on the two ends. Now that very act of sliding would loosen the wiring and it would not do the main thing for which it is intended; that is, it would slip.

Q36. While in the case of the Vandenburg attachment, all that would be necessary would be to tap the spur with a hammer, to hold the coil rigidly in place? A. Yes. It isn't necessary even that it be held rigidly in place. You see, all that is necessary is to tap it up so they can't slip out in some way, cannot move up and down. Of course, it is slightly stronger if it is made rigid. 201

Cross Examination:

XQ37. How much practical experience have you had in the actual installation of the concrete reenforcing steel concerning which we have talked? A. I put up a building here in Pittsburgh which was made of reenforced concrete and I have been on the building inspection here

and have inspected buildings that were made of concrete.

XQ38. Is it your opinion that the method of attaching the spiral to the spacer by wire, is different altogether from the Vandenburgh structure? A. As I have said already, if the fastening is done in the field and it is done at every joint, I think it is good enough; perhaps not quite as good as the Vandenburgh idea, but still good enough.

XQ39. That was not the scope of my question.
203 What I meant to inquire was whether the wiring method of attachment is not an altogether different idea from that of Vandenburgh, and outside of the scope of his patent, so far as that is a proper question to ask a witness? A. Yes, it seems to me that wiring to the uprights is outside the scope of his patent.

XQ40. In the record of the Electric Welding Company on this patent, to which reference has been made, I find a patent to Norwood, No. 571,575. Is there any substantial difference between the spur of the Vandenburgh patent and the spur shown in this patent to Norwood?
204

Mr. Lawrence: This question is objected to as an apparent attempt to use the witness as an expert in the interpretation of the patented art, for which purpose he was not produced. It is also objected to as improper cross-examination, as having no relation to any portion of the direct-examination. It is also objected to as

relating to the limitation or scope of the patent in suit, which is not an issue in the present proceedings for accounting.

Mr. Johnston: I will show that it is relevant and material.

Mr. Lawrence: The question is objected to until counsel makes such a showing.

(Question read)

Mr. Lawrence: The witness is instructed that he need not answer that question.

Mr. Johnston: In view of the instruction, I decline to cross-examine further, 206 and I give notice that I shall move in the District Court of the United States to strike out the deposition as taken. I am quite prepared to demonstrate to a Judge the importance, relevance and materiality of the question and of the line which it opened. Counsel has referred to the record in this suit, which makes it available to me for use in cross-examination to any extent which may be necessary. I may state that it is not my purpose to go into a technical and expert examination, but that the question is important 207 nevertheless.

208 *Harry T. Bahr—For Plaintiff—Recalled—Direct.*

New York, December 3, 1919.
10 A. M.

Further hearing before the Master.
Present: Mr. Johnston and Mr. Edwards.

It is stipulated by and between the parties hereto that the deposition of Horace R. Thayer, taken in Pittsburgh before J. Wood Clark, Esq.,
209 on Monday November 20, 1919, be received in this case with the same force and effect as if regularly taken before the Master, and that this deposition consists of 16 pages of typewritten testimony, and that this testimony may be inserted right after the testimony last taken in this case, and the pages renumbered accordingly, beginning with page 60.

Harry T. Bahr, re-called on behalf of plain-
210 tiff:

Mr. Johnston: Master, the witness has found that there are several errors in the account as filed before you, and has revised it in extensive fashion. I would like to have him explain to you how those er-

rors occurred so that there may be no imputation of bad faith on our part.

Mr. Bahr: At the time I last testified I was presented with a statement by Mr. Edwards showing an abnormal cost per ton on several orders, and at that time I promised to investigate and find out the reason. This investigation disclosed that some of my subordinates who had been working on the accounting had confused fabricating of bars with spiraling and on 212 that account had taken in some instances the cost of fabricating into the cost of spiraling where fabricating bars were shipped with spirals.

By Mr. Edwards:

Q86. I do not quite understand what you mean; were costs of putting spirals and bars together included as to some items where there was no such connection had? A. Some of the orders covered bars as well as spirals, and these bars happened to be fabricated, and as fabrication, whether it is spirals or bars practically meant the same thing to some of the men that had been working on the accounting, they included the cost of both. 213

Q87. In other words, there was a duplication of costs? A. I would not exactly say duplication; there was a charge against spirals which should not have been made.

214 *Harry T. Bahr—For Plaintiff—Recalled—Direct.*

Q88. So the costs were excessive as you have stated them? A. In some instances, where bars were shipped together with spirals.

By the Master:

Q89. As I understand the account you now produce shows a profit, whereas the account which you formerly produced showed a loss, is that it? A. Yes, sir.

215 Q90. That is, you included in your former account some costs which should have been charged to bars and which you have included in spirals? A. Yes, sir. I have submitted a schedule headed "No. 1" which gives the items which have been eliminated from Exhibit B which was formerly submitted. The total of Schedule No. 1 deducted from Exhibit B as originally filed will agree with the figures in the summary accounting, showing a profit of $1826.12.

By Mr. Edwards:

216 Q91. You went over the entire account recently when preparing this last statement, did you not? A. Yes.

Q92. And it is correct as far as you know A. Yes.

Q93. And you would like to substitute it for Exhibit B and all the other papers earlier filed A. Yes sir. In the account which I now produce the Exhibit B is to be substituted for th

217

Cost of Spirals sheet in the account filed September 30th.

Q94. I call your attention to the Profit and Loss sheet formerly filed by you, which shows a great many items by order number. Can the same item be identified by the same order number in the paper which you have just produced today, which is marked Schedule B? A. Yes, sir.

218

Mr. Edwards: I offer in evidence the Account Statement filed July 29, 1919.

It is marked Plaintiff's Accounting Exhibit 2.

I offer in evidence the statement filed September 30, 1919, by the defendant.

It is marked Plaintiff's Accounting Exhibit 3.

I offer in evidence the paper this day brought by this witness.

It is marked Plaintiff's Accounting Exhibit 4.

219

Q95. As I understand it, the part of Exhibit 4 which you have marked Exhibit B contains all the order numbers found in Exhibit 3, is that correct? A. Yes, sir.

Q96. But in going over the matter you found some errors, that is, some items which should not be included, and you have put those in Schedule No. 1, which is a part of Exhibit 4, is that correct? A. Yes, sir.

220 *Harry T. Bahr—For Plaintiff—Recalled—Direct.*

Q97. And so these items should be deducted from what is shown in Exhibit B? A. Yes, sir; there is one item to be added to Exhibit B, at the bottom of Schedule 1.

Q98. Will you please explain just why these items on Schedule 1 should be deducted from Exhibit B? A. That answer was volunteered by me at the commencement of this deposition.

Q99. Do the items on Schedule 1 cover spirals not attached to bars? A. I am not able to answer
221 that question; I stated so in my previous testimony.

Q100. Do you know what is covered in the part you have marked Exhibit B? A. I was submitted a schedule of the orders covering spirals by our order department, and on those orders I ascertained the costs.

Q101. But you did not know whether these orders covered spirals attached to bars or spirals shipped separate from bars? A. No, sir.

Q102. Or both? A. No, sir.

Q103. Who does know? A. I stated before I
222 thought Mr. McGee could give that information.

Q104. You are not sure? A. No, sir.

Q105. Then you do not know whether or not orders for spirals and bars to be assembled on the job are included in this report? A. I was simply given a schedule of the orders covering spirals, and I do not know whether these spirals had bars attached or not; any helical is a spiral to me, whether it has something attached or not.

Harry T. Bahr—For Plaintiff—Recalled—Direct. 223

Mr. Johnston: Of course, Master, you understand that these records were all made before any reason existed for supposing that they would have to be investigated hereafter; the decision of the District Court was such as to relieve us of any idea of an accounting.

Q106. As I understand it, the first page of Exhibit 4 is a summary statement? A. Yes, sir.

Q107. I call your attention to the fact that in 224
Exhibit B there are four pages, and then the exhibit seems to continue with page 1, which takes a fresh start on a new page; will you explain why that is? A. When the orders covering spirals were submitted to me they were segregated according to the plant in which the spirals were manufactured, therefore I first ascertained the costs of the spirals made in one plant and then the costs of the spirals made in the other.

Q108. I call your attention to the part of Exhibit 4 which is marked Invested Capital; please explain just what that is? A. When I testified before you asked me to inform you the manner 225
in which I arrived at the interest charge included in Summary Accounting. I explained at that time how I did so, but you asked me to give you the details. This schedule gives those details.

Q109. What is the meaning of the column under Capital; does that represent money actually paid in? A. Yes, sir.

Q110. Cash? A. Cash and property.

226 *Harry T. Bahr—For Plaintiff—Recalled—Direct.*

Q111. What was the nature of the property? A. Patents and other property.

Mr. Johnston: I think what counsel is getting at is the capital on which dividends are computed.

Mr. Edwards: I object to the item Capital, as being indefinite and showing no definite monetary value, and therefore not suitable for the purposes of computing in-

227 terest.

Q112. I call your attention to the column Surplus, and ask you if that represents cash? A. That represents the profits that the company have earned which have not been distributed.

Q113. Would that be in the form of cash or other liquid assets? A. Other assets, cash and other assets; you may put it in buildings and other permanent assets.

Q114. But that surplus represents actual value to the amount stated, is that right? A. Yes, sir.

Q115. No patent rights or anything like that

228 is included under the item surplus? A. No, sir.

By Mr. Johnston:

Q116. The capital and surplus combined represent actual values in the plants, and so on? A. Yes, sir.

Mr. Edwards: I object to the question as leading.

Objection overruled.

229

By Mr. Edwards:

Q117. I call your attention to the page headed Sales, and ask you if the column at the right indicates the gross sales of all the products of the company? A. That represents the net sales.

Q118. What is the difference between the gross and net sales? A. You may have to allow freight to destination, so the gross sales would represent the amount you bill before allowing the freight.

230

Q119. Then the difference is not very great? A. No, sir—on $15 000,000 worth of business it is quite an item, the freight.

Q120. But only a small percentage? A. Yes, sir. In a number of cases we are called upon to make a delivered price to a customer; when billing the material we charge the customer with this delivered price and allow the freight to destination, which gives us the net selling price.

By the Master:

231

Q121. You mean by that, it represents the net cash which you receive for the goods? A. Yes, sir; if we receive the cash.

Q122. The net payment that is made for the goods? A. Yes, sir; or the amount we are entitled to for the goods.

232 *Harry T. Bahr—For Plaintiff—Recalled—Direct.*

By Mr. Edwards:

Q123. I call your attention to the last line of this page, which is "6% for 2¾ years," how did you reach the term "2¾ years?" A. That is the period of the accounting.

Q124. So you charge interest at 6% for the entire period of the accounting? A. During the period that we made the spirals.

233 Mr. Edwards: I object to this item as incorrect on its face; some of these sales were made early and some late, and I should not be charged with interest the entire period.

The Witness: In the right hand column are the sales for the period of the accounting of all products, amounting to $15,000,000. Below this item is given the sales, value of the spirals shipped during the period of the accounting. The ratio of the spiral sales to the total sales gives a

234 percentage of approximately 1%, which used on the average invested capital as disclosed on the previous sheet, gives a figure of $24,758.05, on which interest should be figured for the period of the accounting.

Q125. That is not in dispute, but the question is whether or not interest should be calculated for the entire period of the accounting as if all

sales had been made the first day the accounting commenced, whereas the sales have been made from time to time during the entire period covered by the accounting and therefore the interest rate should correspond, is this not correct? A I don't want to enter into a controversy of that kind, because the manner in which I have submitted these schedules was what in my opinion was correct.

Mr. Johnston: Master, there must, of 236
course, be a time when the interest charge will begin and a time when it ends; that is most conveniently taken as the period of accounting. The investment was not made from time to time, but existed throughout the entire period of the accounting of course as the concern was in business long before that time. If we are to go into the question as to when the investment was made, of course we will go further back and will off-set a larger amount of interest. Any inquiry of that kind must result in abolishing entirely 237
any accounting for any profit whatever.

Q126. Why don't you take the average time for interest instead of beginning 2½ years back; take a period in about the middle of the accounting?

Mr. Johnston: Objected to as asking for a conclusion on a question of law.
Objection sustained.

238 *Harry T. Bahr—For Plaintiff—Recalled—Direct.*

Q127. As you have computed interest you have calculated as you would calculate if all sales were made the first day covered by the accounting, that is correct, is it not? A. I have computed interest in accordance with the statements which I have submitted, which are self-explanatory.

Q128. Is it not exactly the same as it would be if all sales were made the first day covered by the accounting? A. I don't know.

Q129. Have you taken into consideration that
239 the sales were made during the entire period covered by the accounting? A. Yes, sir.

Q130. Were all those sales made over a period of 2¾ years ago? A. I don't understand.

Q131. Were all those sales made more than 2¾ years ago?

Mr. Johnston: Objected to as immaterial.

A. They were made over a period of 2¾ years as stated in the accounting.

240 Mr. Edwards: I object to the item of interest, on the ground that the weight of authority is against the allowance of it.

Q132. I call your attention to your answers to questions 70 and 71, which were given at your last appearance before the Master, and ask you whether or not you can explain the discrepancies therein referred to? A. I have already answered that question.

241

Q133. Will you please answer it again so that it will appear right in this connection? A. In the account made numbered Exhibit 3, there were included items of cost which should not have been included, which was explained in detail by me at the beginning of my testimony here today.

Q134. I call your attention to Exhibit 3, and columns 2 and 4, and ask you if the selling price given in the fourth column applies to the complete order stated in the second column? A. Yes, I believe it does.

242

Q135. That is corrected? A. Yes.

By the Master:

Q136. In Schedule 1 of Exhibit 4, column Manufacturing and Overhead, column of Labor Cost, and column Total, the total is the total of the manufacturing overhead and the labor cost? A. Yes, sir.

Q137. Then the amount to be eliminated from Schedule B is the total? A. Yes, sir.

Q138. And that is to be deducted from the total cost as shown on Exhibit B, is it? A. Yes, sir, according to order number.

243

By Mr. Edwards:

Q139. And the fifth column of Exhibit 3 should be changed accordingly? A. Yes, sir, any deductions would affect the profit and loss.

244 *Harry T. Bahr—For Plaintiff—Recalled—Cross.*

By the Master:

Q140. Take the first item of Schedule 1, Y13007, I find that same item in Exhibit B, I find a labor cost there given of $20.64, but the labor cost on Schedule 1 of that item is $18.25; do you mean that the real labor cost is $20.64 after deducting $18.25 from the labor cost as given in Exhibit 3? A. Yes, sir.

245 By Mr. Edwards:

Q141. I call your attention to Schedule 1 of Exhibit 4, and particularly to the last column entitled "Total," and ask you if the items in that column correspond to the item marked "Cost" in Exhibit 3? A. They don't correspond; they are to be eliminated from costs in Schedule B.

Direct examination closed.

Cross Examination by Mr. Johnston:

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XQ142. Mr. Bahr, in preparing this schedule, and in fact throughout this account, I want to know if you have done so in the same way that you would have done if you had prepared it for your own Board of Directors? A. Yes, sir.

Deposition closed; signature waived.

The Master: I direct the defendant to state whether the account filed shows bars and spirals shipped together only,

or whether it also includes spirals shipped separately also; and to state whether the account includes all shipments of the class which are included in the account.

Mr. Edwards: I want all spirals and bars which are to be assembled on the job so as to embody the patented invention here in suit.

The Master: If the account does not include those to be assembled on the job, then you are to supply an account showing those that are sold to be assembled 248 on the job.

Mr. Johnston: I doubt if we can furnish you an account of that.

New York, February 14, 1920.

It is stipulated and agreed by and between counsel that Harry L. McGee, if called as a witness before the Master in this case, would 249 testify as follows:

1. That the account filed is this case was prepared under instructions from him by a considerable number of subordinates in the office of the Concrete Steel Company and involved the investigation of a large number of entries and records which had not been kept with reference to an accounting in a patent case, but

according to the ordinary course of business of the defendant; and that he therefore is unable to answer fully all the questions which could be based upon that account, but has endeavored to ascertain, as well as he could, the facts relating to it concerning which plaintiff's counsel is inquiring at this time. That account includes all of the spirals and spacers, which are sometimes called "bars", but which in this trade are called "spacers", which were assembled in the shops of the Concrete Steel Company and
251 all spirals and spacers corresponding to the Vandenburgh patent which were shipped for field assembly; and so far as he knows or has been able to ascertain it includes spirals and spacers which were shipped at different times for the same job, the spacers being like those of the Vandenburgh patent.

2. On the other hand, it does not include spirals when sold separately in the form of coils of wire of a size suitable to be used in concrete reinforcement, nor does it include any spacers sold separately, so far as he is at
252 present advised, except in the cases in which spirals and spacers were shipped to the same job for field assembly, which was a very small proportion of the whole amount of material shipped, the bulk of the business being done in reinforcing which was assembled in the shops.

3. It is stipulated that the defendant admits for the purposes of this case that the accounts filed by the defendant in this case July 29th,

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1919 and September 30th, 1919 as finally revised by a supplemental statement filed December 3rd, 1919 and now in evidence as plaintiff's exhibit number 4 set forth all the infringing devices made, used or sold by the defendant during the time stated in the account.

The plaintiff takes exception to the item entitled "Interest on Capital Invested—$4,085.07" on the ground that the same is illegal, incompetent, irrelevant, immaterial and not properly proven.

The plaintiff takes further exception to all 254
items of loss set forth in the account on the ground that such are irrelevant, incompetent and immaterial.

Plaintiff Rests.

Adjourned to March 6th, 1920, at 10 A. M.

256 *Ralph E. Weber—For Defendant—Direct.*

New York, March 25, 1920

Met pursuant to adjournment.

Present: The Master.
Mr. O. E. Edwards for the Plaintiff.
Mr. T. J. Johnston for the Defendant.

RALPH E. WEBER, a witness produced on be-
257 half of defendant, being first duly cautioned and sworn, deposes and says as follows:

Direct Examination by Mr. Johnston:

Q1. State your name, age, residence and occupation? A. My name is Ralph E. Weber; I am of mature years and live at Summit, New Jersey. My business is that of a cost accountant.

Q2. By whom are you now employed? A. I am employed by the Concrete Steel Company and have been for the past five years.

258 Q3. State briefly your education? A. I have had a full academic education and hold the degree of A. B. from Yale University. I entered the employ of the Carnegie Steel Company as soon as I left Yale and was employed there seven years prior to entering the employ of Concrete Steel Company.

Q4. What branch of accountancy do you pursue? A. I am the cost accountant of the Concrete Steel Company and it is my duty to determine the cost of shop operations. For that

purpose, I obtain information which is furnished to me by those who do the work, either directly or through various forms of reports. The figures which I deduce from the reports are those which are used by us in computing the cost of work and are employed for future guidance in preparing estimates of cost when these are furnished to customers.

Q5. Are you familiar with the cost to the Concrete Steel Company of assembling the structure which has been called in these hearings the "Vandenburgh concrete reinforcement", 260 consisting of a verticle bar vefthe Lnavml consisting of a helical coil of wire, which we have generally called a "spiral", attached to an angle bar by slots or kerfs in the edge of the bar, the intervening portions of the bar being then bent down over the slot or kerf, so as to hold the coil of wire in place? A. Yes. It has been a part of my duty to determine the cost of assembling these structures in the past.

Q6. What was the cost to your company of assembling the structure referred to? A. I find that the average cost of assembly of the structure referred to in your questions as the Van- 261 denburgh structure was $4.88 per ton.

Q7. After the Vandenburgh structure was discontinued, the Concrete Steel Company adopted another form of reinforcement, consisting of a coil of wire which was attached to an angle bar by being inserted in slots in the edge of the bar and then having a wire inserted which secured the coil of heavy wire reinforcing is place relative to the angle. Are you fam-

iliar with the cost of assembling this structure? A. Yes. This structure has been sold by the Concrete Steel Company in a number of instances and it has been part of my duty to find out just what it cost, so as to make proper charges to customers in the same way as I did with regard to what you have called the Vandenburgh structure.

Q8. What was the cost of assembling that structure? A. I find that the cost of assembling that form of reinforcement was 5.62 per ton.

263 Q9. Has your occupation made you to any extent familiar with the quantities which are used in particular constructions; for example, the amount of coil and the amount of spacing bar for the coil which would be required for different sizes of columns, having reference to the sizes of the wire in the coil and the weight of the angles. A. Yes. It has been a part of my duty to inform myself to a greater or less extent on the subject inquired of. I am, of course, familiar with the weights per foot run of different wires and shapes which are employed in concrete reinforcement. These are

264 tabulated in standard works on the subject and I have used these tables so much and have, in practice, found them so accurate that I have become familiar with them, to a certain extent. and remember many of the figures without reference to the tables; though, of course, it is my practice to refer to the tables whenever any doubt arises in my mind.

Q10. Have you read and do you understand the testimony given by Bruce Clark White and

Horace R. Thayer on behalf of the plaintiff in this case? A. I have read those depositions and I believe that I understand them.

Q11. I will turn first to the depositions of Mr. White. On the 46th pae of the typewritten record, Mr. White was asked this question: "What do you estimate the cost of wiring on the spirals to be for a column, we will say, having spirals two feet in diameter and containing, roughly, half a ton of material and made of half-inch wire rod." State what would be the length of a column conforming to the 266
conditions stated in the question, assuming the usual weights of the iron in the half-inch rod used for the coil and in the angles used to space it. In your answer, you may state whether a column of the character indicated in this question is or is not a commercial proposition, in view of your acquaintance with that subject, and you may give the reasons why it is or is not. A. The length of a column conforming to the conditions stated in the question would depend upon the pitch or distance between the turns of the spiral. Assuming the pitch to be three inches, the length of such a column with 267
four angle bar spacers of 2″ x 2″ x 1/8″ dimensions would be 423/4 feet. It is my opinion that a column of these dimensions would not be a commercial proposition because it would be a difficult and expensive thing to handle in transportation and on the job. I do not know of any type of building in which such a column would be required.

268 Q12. Mr. White's answer said that the cost referred to would vary according to locality and efficiency of management and supervision; but that it "might amount to $15.00 a ton". Do you agree or disagree with Mr. White's answer and in what respects and why? A. I agree with Mr. White's answer, so far as he says that the cost would naturally vary under the conditions he states. I think however that the work can be done for very much less than $15.00 per ton. A
269 column of the dimensions just described would cost for this work not more than $6.00 per ton, based on the assumption that it would take four men working, at fifty cents per hour, one and a half hours to do the work. This is more than the average column two feet in diameter and made of half inch rod would cost to assemble, however, because the average column would be very much shorter and therefore easier and more economical to handle.

Q13. Mr. White said further on that he could hardly fix the figures closer without having every particular that would affect the cost. Do you
270 agree or disagree with that and why? A. I agree with Mr. White that it would be necessary to have every particular affecting the cost in order to fix a close figure, because the experience and efficiency of the workmen, the shop facilities for doing this kind of work, and so forth, would affect the cost.

Q14. Another question asked Mr. White assumed that a column was 20 feet high, with half

271

inch coil spaced 3 inches apart and 2 feet in diameter. What have you to say as to the commercial character of a column of that description. A. I think it quite possible that there are buildings which would require a column of the dimensions just stated, though it is considerably longer than the average column which the Concrete Steel Company has been making. The distance between floors in the average building of reinforced concrete is seldom as much as twenty feet, and therefore a column as long as that described would be exceptional.

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Q15. Mr. White said that the cost per ton for such a column for the wiring alone would be about $40.00 for the assembly part alone. If you will read Mr. White's answer, beginning at the bottom of page 47 and ending at the top of page 49½, you will get a more accurate idea of what he said and after you have read it, please state the respects in which you agree and disagree with what he has said, with your reasons. A. I think the cost per ton for such a column for the wiring alone would be more nearly $4.00 than $40.00, for the assembly work alone. The total weight of such a column would be about 467 pounds.

273

Q16. At the bottom of page 49½ Mr. White says "all such estimates are subject to check in actual performance". Do his estimates agree with the checks you have made of actual performance on wired work? A. I agree that they are subject to check. Mr White's figures do not agree with the figures which I have compiled from

work actually done by our concern. From the first of October, 1919 to the end of February, 1920 the cost of assembling 611.79 tons of spirals by the wiring method we use was $3438.58 or an average of $5.62 per ton. The average weight of these spirals was less than 250 pounds each.

Q17. On page 50, Mr. White says "one must have an exact layout of the whole contract to be executed". Does that conform to your experience? A. It is necessary to know the complete dimensions of the columns to be made, to know
275 the rate paid for the labor, and something of the facilities provided for doing the work, to enable one to submit a fairly accurate estimate of the cost.

Q18. On page 51, Mr. White says:

> "In view of the conclusions expressed in my previous replies, and the assumption that the conditions set forth in the questions would obtain ordinarily, my opinion is that a royalty of $12 per ton would be fair and equitable".

276 Is the assumption that the conditions set forth in the questions would obtain ordinarily a proper one? A. The conditions set forth in the questions would not obtain ordinarily. I do not know where or how a spiral column 42¾ feet long and weighing half a ton could be used. Even a column twenty feet long and weighing nearly a quarter of a ton would be exceptional. Any figures submitted on the cost of assembling

such columns could not therefore be fairly accepted as representing ordinary conditions.

As for the royalty of $12.00 per ton, I think it excessive to pay any such amount for the privilege of using a method which yields us no substantial advantage.

Q19. Mr. Thayer says on page 68 in answer to question 24 that he finds the cost of wiring joints to be about $13 per ton, as an estimate. Does that accord with your experience? A. Mr. Thayer's estimate of $13 per ton is high, as we have found if possible over a period of five months to as- 278
semble spiral columns by fastening the rod to the angle with wire at an average cost of 5.62.

Q20. Mr. Thayer gives in the same answer the cost of assembling the Vandenburgh structure, as we have called it, at about $3 a ton. Does that accord with your experience? A. Our experience with the Vandenburgh structure has been that the cost of assembling has been nearly $5 a ton.

Q21. These answers of yours about relative costs have been of actual and not estimated costs, as I understand the matter. Is that the fact? A. Yes, the figures of 5.62 per ton for the 279
wired structure and $4.88 per ton for the other are my records of what it has actually cost to do this work.

Q22. Mr. Thayer, in answer to Q27, says that a fair royalty for the Vandenburgh patent would be $8 a ton. Do you agree with Mr. Thayer? A. If, as shown in the comparison of actual costs which I have submitted, it is shown that the use

280 *Ralph E. Weber—For Defendant—Cross.*

of the Vandenburgh method yields us a saving of only a few cents per ton over the wiring method I cannot see the fairness in a royalty of $8 per ton for the privilege of using the Vandenburgh method.

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281 Further hearing held before the Special Master at his office in the Post Office Building, Park Row, New York City, April 7, 1920.

Appearances:

William Parkin, Esq., Special Master;
O. Ellery Edwards, Esq., for plaintiff;
Thomas J. Johnston, Esq., for defendant.

RALPH E. WEBER, a witness for the defendant, resumes the stand:

282 *Cross Examination by Mr. Edwards:*

The direct examination of Mr. Weber was not taken before the Special Master but was taken by agreement in the office of defendant's counsel without the presence of either the Master or plaintiff's counsel.

It is stipulated that the plaintiff may enter his objections after the cross examination.

283

XQ23. Mr. Weber, I notice that you refer to a wire spacer in your answer to questions 7 and 8, page 94 of the testimony, will you produce a sample of this spacer? A. Yes, sir, we can produce a sample of the spacer?

XQ24. Will you produce also a blue print, a sample and a print, if you can? A. Yes, sir.

XQ25. Will you please turn to your answer to Q6. and state how you derived that figure of $4.88 a ton? A. The reports I get from the shop where the spirals are manufactured showed the tonnage assembly and the amount of money ex- 284
pended in the labor of assembling, it is simply a matter of deriving the average cost per ton then.

XQ26. Will you give the figures, that is the tonnage and the average cost? A. Well, I think that is given later in the direct examination (referring to testimony) I think I covered that—no, that doesn't appear here, but I can produce these figures for you.

XQ27. Will you please do so? A. Yes, here is the exact tonnage, the exact amount of money, the period during which the labor was performed, 285
from which was derived the average cost of $4.-88 a ton.

XQ28. I call you attention to your answer to Q11, page 95, and the following questions and answers which relate to Mr. White's testimony. What kind of spacing bar did you understand Mr. White to be testifying to when he spoke of the prior art other than the Vanderburgh patented structure? A. Does he mention anything

prior to the Vanderburgh—I understood the spacer to be an angle spacer.

XQ29. That was the only one you understood Mr. White to testify to? A. That is the only one I understood him to be discussing.

XQ30. You did not consider a spacer where the coils are held to the spacer by wires only? A. Well that might be an angle spacer.

XQ31. Did you consider a spacer of that kind when you were testifying in your direct, in this case? A. I considered only an angle spacer.

287 XQ32. How were the coils held to this spacer in the embodiment you considered? A. By the wiring method you mean?

XQ33. I asked you what you meant—you made certain comparisons there and reached certain figures? A. I had in mind the Vandenburgh method of attaching the spiral to the spacer and the wiring method that we now use.

XQ34. And those were the only two methods which you considered? A. Yes, sir.

XQ35. And the same applies to your answers to the Thayer deposition? A. Yes, sir.

288 XQ36. Will you now produce the figures called for to show how you reached the sum of $4.88 as specified in your answer to Q6? A. Yes, sir. This figure $4.88 was derived from the reports received by me from the shop, covering the period from March 15, 1918, to May 31, 1919 inclusive. It covered 865.361 tons, assembled at a cost of $4221.59, which gives an average cost of $4.88 a ton.

XQ37. That was shop assembly? A. Yes, sir.

XQ38. It does not apply to job assembly? A. No,—you mean field assembly?

XQ39. Field assembly? A. Yes, sir.

XQ40. Do you know what the figures would be if you covered the entire period of the accounting from August 15, 1916 to May 16, 1919? A. Figures covering what?

XQ41. The cost of assembly in the shop? A. Well that is the cost of assembly in the shop during that period—isn't that the period?

XQ42. No. A. No, I couldn't give you that. 290

XQ43. You did not have charge of the accounting at that time? A. No.

XQ44. Except as stated in your answer? A. Yes, sir.

Mr. Edwards: Cross examination closed. I want to object to the entire deposition as immaterial and irrelevant to any issue in this case, because the measure of damages taken by the witness is subsequent to the infringements and is not available art as of the time of the infringement or as of the date of the patent in suit. 291

Overruled.

Exception.

Adjourned to Monday, May 3, 1920 at 11 a. m.

292 *Fred T. Llewellyn—For Defendant—Direct.*

New York, Monday, May 3, 1920.

Met pursuant to adjournment.
Present: The Master,
O. E. Edwards, Esq., for complainant.
T. J. Johnston, Esq., for defendant.

FRED T. LLEWELLYN, a witness produced on behalf of defendant, being first duly cautioned and sworn, deposes and says as follows:

293 By. Mr. Johnston: Master, according to the agreement entered into with my brother Edwards, I have submitted to Mr. Llewellyn the questions which I will ask him upon his direct examination and he has himself dictated the answers to them. Therefore, the direct examination is already written out and it was served upon Mr. Edwards on the 29th of April. I therefore submit the witness for cross-examination at once.

294 Q1. State your name, age, residence and occupation? A. My name is Fred T. Llyewellyn; I am of mature years and am employed in the office of the president of the United States Steel Corporation as engineer and technical assistant. My residence is Montclair, New Jersey.

Q2. What experience and education have you had in the line of your profession? A. I studied at the Universities of London, England, and Minnesota, U. S. A. Was Structural Steel Draftsmen, four and one-half years; Southern

295 Agent and Engineer for Gillette Herzog Mfg. Company, six years; Contracting Manager, American Bridge Company, four years; Engineer in New York Sales office, for Carnegie Steel Company, eleven and one-half years; during the recent war in charge of steel distribution, United States Shipping Board, six months; in present position one and one-half years.

While employed by Carnegie Steel Company, I gave special attention to the use and sale of steel for concrete reinforcement.

296 Am a member of American Society of Civil Engineers, American Iron and Steel Institute, and a number of other technical organizations.

Q3. What experience have you had which qualifies you to testify about rates of royalties paid for the use of patented inventions in iron work and especially concrete reinforcement? A. I participated in two negotiations for patent rights to produce steel sheet piling am the patentee of a method of constructing interlocking steel and concrete sheet piling; and have negotiated with many patentees of concrete reinforcement for rights to produce and sell under their patents.

297 I have also prepared several reports for my employers regarding the value of patents on other steel products.

Q4. Have you read and do you understand the depositions which have been given in this case by Horace R. Thayer and Bruce Clark White? A. I have read the depositions and I believe I understand them.

Q5. Have you examined the Vandenburgh reissue patent No. 14,182 which is in suit in this case? A. I have.

298 *Fred T. Llewellyn—For Defendant—Direct.*

Q6. State what in your experience have been royalties actually paid for the use of patented iron-work structures of different kinds, including reinforced concrete structures, if any such there were? A. The royalties paid have usually depended on the extent to which a patent has been exploited previous to negotiation.

For patent rights to produce and sell fully exploited forms of steel sheet piling one dollar per ton was paid, and the same rate was paid for a patented deformed bar for concrete re-inforcement, including the assistance of the patentee in
299 marketing the bar.

For an undeveloped patent on steel and concrete tunnel lining a lump sum royalty of twenty-five dollars was paid.

Q7. Mr. Thayer says in answer to Q27 that a fair royalty for the use of the Vandenburgh structure was "about $8.00 a ton" and Mr. Thayer bases that upon his "estimates" of the work of assembling the Vandenburgh structure at $3.00 a ton, and that of a wired structure at $13.00 per ton. Are these figures reasonable, in your opinion? A. I consider a royalty of eight
300 dollars per ton for the Vandenburgh structure to be absurdly high and entirely unreasonable. I have had no detailed experience as to the comparative costs of assembling spirals, but consider ten per cent, of the saving or of the additional profit to be a reasonable measure of the value of such a patent in view of the risk of non-success assumed by the user.

Q8. Mr. Thayer says, on page 5, in answer to Q15 "the method of wiring uses up a good deal of the section of the bar." Is that statement

true? A. I do not see how Mr. Thayer reaches this conclusion. Both the Vandenburgh and the wiring system could be so arranged as to make useless or useful a large percentage of the bar section.

Q9. Mr. Bruce Clark White, page 51, states that for the Vandenburgh construction "a royalty of $12.00 per ton would be fair and equitable." Does that agree with your opinion? A. It does not. My answer to Q7 applies also to this question. I might add that the trade understanding is that the sale of spirals is frequently 302 not profitable in itself, but merely serves to assist in the sale of other concrete reinforcement.

Q10. Mr. White says, on page 56, that there were profits at times of $30.00 per ton upon steel used in concrete reinforcing. How does that accord with your experience. A. I know of no such rate of profit being made on sales involving a fair tonnage, and believe Mr. White must have referred to trivial lots where the selling expense allowed for would be high in proportion to the shop cost. It is my experience that five dollars per ton profit is a very satisfactory total net 303 profit on steel for concrete reinforcing.

Q11. What effect upon the payment of royalty does the fact that the patented structure has been embodied in existing buildings or other structures have upon the rate? A. The payment of royalty under those circumstances has an element of duress in that an injunction against the existence of the buildings or other structure would be disastrous to the licensee; and therefore he would be willing to pay a much larger rate than would be a fair rate in an open negotiation where the licensee had made none of the patented article.

No cross-examination.

304

UNITED STATES DISTRICT COURT

SOUTHERN DISTRICT OF NEW YORK.

GEORGE E. VANDENBURGH,
Plaintiff,
vs.
CONCRETE STEEL COMPANY,
Defendant.

305 Testimony of ALBERT L. JOHNSON, Buffalo N. Y., May 7th, 1920, taken by and before Henry Werre, Esq., Notary Public duly authorized pursuant to the Judicial Code, and the equity rules as amended.

Present: On behalf of Defendants, Thomas J. Johnston, Esq.

No appearance on behalf of Plaintiffs.

ALBERT L. JOHNSON, a witness called on behalf of Defendants, being first duly cautioned and sworn, deposes and says as follows:

Direct Examination by Mr. Johnston:

Q1. State your name, age residence and occupation. A. Albert L. Johnson, mature years, president of the Corrugated Bar Company, Inc., residence, Buffalo, New York.

Q2. Do you appear under subpoena or otherwise? A. Under subpoena. 308

Q3. Have you produced the contract between Vandenburgh and the Corrugated Bar Company, which is referred to in subpoena which was served upon you? A. I hand it to you herewith, I do; and I also produce the power of attorney by which Mr. Griffin signed Mr. Vandenburgh's name to this contract. (Witness hands paper to counsel.)

Mr. Johnston: The two papers are offered in evidence as Defendants' Exhibits, Corrugated Bar Company Contract, and 309 Corrugated Bar Company Power of Attorney.

Inasmuch as these are original papers which should not be taken from the files of the witness, the stenographer is instructed to copy them into the record.

DIRECT EXAMINATION CLOSED.

310 LICENSE AGREEMENT.

THIS AGREEMENT, made this 3rd day of October 1919, by and between George E. Vandenburg, of San Francisco, California, party of the first part, and Corrugated Bar Company, Inc., having a place of business in Buffalo, N. Y., party of the second part, witnesseth,

Whereas said George E. Vandenburgh is the sole owner of Reissue Letters Patent No. 14182, dated August 15, 1916, for an improvement in Reinforcing Bars, being a reissue of United
311 States Patent No. 841741, dated January 22, 1907; and

Whereas the said Corrugated Bar Company, Inc. is desirous of obtaining the exclusive right and license to make, use and sell reinforcing bars under said Reissue Patent, and of securing a release for itself and its customers and all users of buildings in which its products may have been embodied heretofore, from all claims of George E. Vandenburgh under the said Letters Patent or Reissue thereof, now, therefore, in considera-
312 tion of the sum of Three Thousand Dollars ($3,000) by said second party to said first party in hand paid, receipt whereof is hereby acknowledged, and of the promises hereinafter contained, the parties hereto have agreed as follows:

(1) The party of the first party hereby grants to the second party the exclusive right and license to manufacture, use and sell reinforcing

bars made in accordance with said Patent and said Reissue Patent, or any improvement or reissue thereof, for the life of said Reissue Patent, throughout the United States, except Hawaii, Alaska, California, Nevada, Oregon and Washington, on the terms and conditions herein expressed and on no other conditions, provided that as to Idaho, Montana, and Arizona this license shall not be exclusive.

(2) The party of the first part hereby releases and discharges the party of the second part and 314
all of its agents and customers, and all present and future owners of buildings in which any of the products of the second party have been embodied heretofore, from all claims and demands of the first party and all others under the aforesaid Reissue Patent or Original Patent, and authorizes and licenses the continued use of all such buildings for the full term of said Reissue Patent.

(3) The party of the second part agrees to pay the party of the first part the sum of Three Dollars ($3) for each and every ton of reinforc- 315
ing bars, which term is intended to cover both the spiral and spacing bar or bars to which the spiral is secured, made or sold by it as disclosed in said Reissue Patent, provided that the minimum royalty from October 1, 1919, to November 30, 1921, shall be One Hundred Twenty-five Dollars ($125) per month, and that from November 30, 1921 to the end of the term of said Reissue

Letters Patent, the minimum royalty shall be Three Hundred Dollars ($300) per month.

(4) The license fees herein called for shall be paid to the first party upon the first day of every third month after the signing of this agreement, in San Francisco exchange, and such fees shall be paid within twenty days after they are due. The second party agrees to keep full and complete books of account showing the amount of reinforcing bars embodying the patented invention sold by it under this agreement, and it hereby agrees to render a statement (verified if requested) of the amount of said reinforcing bars sold by it under this agreement in the preceding three months, with every payment; and said books of account shall be open to the inspection of the first party or his agent at any reasonable time. The second party hereto hereby expressly recognizes the validity of claims 3 and 5 of said Reissue Patent, and agrees not to set up the invalidity of either of said claims in any action based on this contract.

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318 (5) It is understood that the license hereby granted to said second party shall entitle it in turn to license other parties; but in case said second party grants any sublicenses to others, said second party obligates itself to require of said sublicensees statements of account of all reinforcing bars embodying said patented in-

vention made and sold under said sublicense, and also agrees to pay to said first party on account of all reinforcing bars made and sold by its sublicensees, at the same rate as if said reinforcing bars had been made and sold by said second party.

(6) If this license agreement is terminated for any cause, such termination shall not discharge the second party from liabilty to the first party for accounting for all license fees that may then be due. 320

(7) It is Mutually agreed and understood that in the event that claim 3 of said Vandenburgh Reissue Patent shall be decreed by any Circuit Court of Appeals to be invalid or to be insufficient to cover the construction there in suit, then in that case all of the obligations of said second party herein shall cease and terminate, and the license hereby granted to it shall continue to the full end of the term of said Reissue Patent, free and clear of all royalties and license fees.

(8) It is further understood and agreed that this license gives the second party no interest in said Reissue Patent beyond that expressly stated, and that said second party has no interest whatever in the collection of damages from any past infringements thereof, all such claims for 321

past infringements being reserved by said first party.

(Signed at Washington, D. C. today, Oct. 6, 1919.)

GEORGE E. VANDENBURGH,
George E. Vandenburgh by
Carlos P. Griffin,
His Attorney in Fact.

323 Witnessed by G. O. Vass,
(Sad. Union Bk. & Tr. Co. S. F.)

In testimony whereof, the Corrugated Bar Company, Inc. has caused this agreement to be duly executed by its properly authorized officers at Buffalo, New York, this day of Oct. 1919.

CORRUGATED BAR COMPANY, INC.
By A. L. Johnson,
President.

324 (Seal)

Power of Attorney. 325

DISTRICT OF COLUMBIA, }
CITY OF WASHINGTON, } ss.:

Personally appeared before me, WM. H. DORSEY, a Notary Public in and for the District of Columbia, George E. Vandenburgh and Carlos P. Griffin, known to me to be the persons described in the annexed agreement, and they acknowledged to me the execution thereof this Sixth day of October, 1919.

WM. H. DORSEY, 326
Notary Public, D. C.

TO ALL WHOM IT MAY CONCERN:—

In consideration of the sum of Ten Dollars to me in hand paid by Carlos P. Griffin, of City and County of San Francisco, State of California, Be it known that I, George E. Vandenburgh, of the City and County of San Francisco, State of California, have made constituted and irrevocably appointed, and by these presents do make, 327
constitute and appoint said Carlos P. Griffin my true and lawful attorney in fact for me and in my name, place and stead, and for my use and the use of my heirs upon my decease, to ask, demand, sue for, collect, receive and receipt for any and all sums of money that may be due or owing or payable to me as the inventor of the reinforcing bar covered by letters patent of the United States #841,741, dated January 22nd, 1907, and reissue patent on the same subject and patent number 14,182, dated August 15th, 1916, for the life of

said reissue patent irrevocable and with an interest in the subject-matter hereof, giving and granting unto my said attorney full power and authority in and about the premises to collect for me any back royalties that may be or become due, and to make, give or grant licenses, agreements, rights or powers to manufacture, use or sell concrete reinforcing bars made in accordance with the disclosure of said patent and reissue patent for any term or territory within or throughout the United States, and with power to use all due
329 means, course or process in law or equity for the complete execution of said collections, licenses, agreements, rights or powers, with the some force and effect as if executed by me in person. And to appear in any action brought upon my behalf on said patent or reissue patent before any necessary judge or tribunal in any place throughout the United States, and with power to continue such actions, licenses, agreements, to release and settle with any person or corporation for back or future royalties, or licenses, with power to continue such effort as he may make upon my death
330 for the benefit of himself as his interest may appear, and for the benefit of my estate and heirs, as well as giving him power to appoint associate attorneys for the purpose of representing me and him in any suit or suits that may be brought in my name on said reissue patent, and I hereby affirm, ratify and approve all acts he or his associates may take under this power and by virtue of these presents.

331

IN TESTIMONY WHEREOF, I have hereunto set my hand and seal at San Francisco, California, this 13th day of January, 1917.

GEORGE E. VANDENBURGH.

State of California,
City and County of San Francisco, } *ss.*:

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On the 13th day of January A. D. One Thousand Nine Hundred and Seventeen before me, HENRY B. LISTER, a Notary Public in and for the City and County of San Francisco, State of California, residing therein, duly commissioned and qualified personally appeared GEORGE E. VANDENBURGH, known to me to be the person whose name is subscribed to the within instrument, and acknowledged that he executed the same.

IN WITNESS WHEREOF, I have hereunto set my hand and affixed my Official Seal, at my office in said City and County of San Francisco, the day and year first above written.

333

HENRY B. LISTER,
Notary Public.

In and for the City and County of San Francisco and State of California.

334 *Notary's Certificate.*

UNITED STATES OF AMERICA,
Western District of New York, } ss.:

I, HENRY WERRE, a Notary Public duly authorized under the laws of the state of New York, having authoriy in and for the County of Erie in said state, do hereby certify that on Friday the 7th day of May, 1920, at 10:30 o'clock in the forenoon, I was attended by the witness Albert L. Johnson, who being by me duly cautioned and
335 sworn to tell the truth, the whole truth and nothing but the truth in a cause depending in the District Court of the United States, in and for the Southern District of New York, wherein George E. Vandenburgh is the plaintiff and the Concrete Steel Company is the defendant, did depose and say as by his deposition hereunto annexed doth appear.

I do further certify that I was attended by Thomas J. Johnston, Esq., on behalf of the defendant, and that no counsel appeared on behalf of the plaintiff.

336 I do further certify that notice was given to counsel for the plaintiff as appears by said notice returned herewith.

I further certify that the exhibits referred to by the witness were returned to him, and that a copy thereof made in the deposition of the witness is a true copy of the same.

I do further certify that I am not related by blood or by marriage to either of the parties or to their counsel nor am I interested directly or indirectly in the event of the cause.

113

Notary's Certificate. 337

And I further certify that at the conclusion of the depositions after they had been written out by a stenographer I sealed the same in an envelope and addressed it to William Parkin, Esq., Master in Chancery, Postoffice Building, New York City, and that I endorsed upon the envelope the title of the case.

In Witness Whereof, I hereunto set my hand and affix my Seal of Office this 11th day of May, 1920.

338

Henry Werre,

(Seal) My commission expires March 30, 1921.

340 *Case.*

Further hearing taken at the office of the Special Master, Post Office Building, Park Row, New York City, May 28, 1920.

APPEARANCES:

WILLIAM PARKIN, ESQ., Special Master;
O. ELLERY EDWARDS, ESQ., for the Plaintiff;
THOMAS J. JOHNSTON, ESQ., for the Defendant.

341 Mr. Johnston: I call on plaintiff to produce a contract made between George E. Vandenburgh, plaintiff in this case, and The Corrugated Bar Company, being dated October 6, 1919 and purporting to be a contract of exclusive license. It has a bearing upon the question of proper amounts of royalties, being a contract for that purpose. I also call on the plaintiff to produce a copy of the power of attorney given by Mr. Vandenburgh to Mr. Carlos P. Griffin by virtue of which he executed that contract. In default of the production of these documents I offer to the Master the evidence of
342 Albert L. Jackson president of the Corrugated Bar Company which I understand has already been returned to the Master by the officer who took the deposition, as evidence of the contents and execution of the two instruments referred to. I also offer the decision of the Circuit Court of Appeals of the Third Circuit in the suit of George E. Vandenburgh against Electric

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Welding Company, No. 2479, October Term, 1919. This is not certified but the case has now been reported in 263 Federal Reporter, page 95. I offer this opinion as an exhibit and will mark it Defendant's Accounting Exhibit Electric Welding Opinion.

It is marked Exhibit C.

Mr. Edwards: I will reserve all objections until I can communicate with senior counsel in San Francisco, it may be that the exhibits can be admitted without ob- 344
jection.

Mr. Johnston: I also ask the Master to order the production before him of the contract of license with the Concrete Steel Products Company to which Mr. Griffin on page 5 of the accounting record has testified, and in default of the production of that document I shall object to the testimony of Mr. Griffin, which was stipulated, as secondary and irrelevant.

Mr. Edwards: I will have to communicate with Mr. Griffin about this also, I know 345
nothing about it.

Mr. Johnston: Mr. Edwards, have you any objection to stipulating that the exhibit which I now show you is a sample of the structure which was made by the Electric Welding Company and which was in issue in the suit in the Third Circuit, the decision in which is reported in 263 Federal Reporter page 95?

Mr Edwards: I have no knowledge of this structure, I never saw it before and I

346 *Ralph E. Weber—For Defendant—Direct.*

do not know what the Electric Welding Company made in precise detail, although I did look at the paper exhibits as well as the record in that case. If counsel for the defendant wishes I will be glad to send this model to San Francisco and receive definite instructions as to whether or not we will admit it.

Mr. Johnston: I do not wish to introduce the entire record of the Electric Welding suit before you if that can be avoided, as
347 it is something over a thousand pages, I believe. In the absence of my brother's senior, I ask permission to give testimony concerning this exhibit as if it had been approved, leaving to a later date proof of its authenticity. I will state that it has been furnished me by the Electric Welding Company itself, though I realize that that is not competent and adequate proof; but I think my brother's senior will no doubt stipulate that it is.

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RALPH E. WEBER being duly sworn and examined as a witness for the defendant testifies as follows:

By Mr. Johnston:

Q. You are the same Ralph E. Weber who has already testified in this case? A. Yes.

Q. And your business is still, as I understand it, that of an experienced accountant of the Concrete Steel Company? A. Yes.

Q. Is it your duly in that position to make estimates of the cost of the various structures which that concern puts out? A. It is not so far as new constructions are concerned, as a matter of fact the products which we produce have been produced ever since I have been with the Company—practically all.

Q. But it is your business to estimate costs? A. Yes. 350

Q. And for that purpose you are familiar with the various elements which go into the cost of manufactured structures produced by your company? A. Yes.

Q. You have already testified concerning the cost of assembling spacers and spirals made by the Vandenburgh patent—please examine the sample which I now show you and which is marked for identification Defendant's Accounting Exhibit D, and state the relative cost of assembling that structure in the lots which would ordinarily be required in contracts made by your company if it were put out by them, and compare that cost with the Vandenburgh patented structure to which you have already testified? 351

Mr. Edwards: I object to the question on the ground that the witness is not shown competent to testify as to this structure.

Objection overruled.

Exception.

352 *Ralph E. Weber—For Defendant—Direct.*

A. I think the cost of a structure of this nature, so far as the labor is concerned, would probably be about the same as that of the Vandenburgh structure.

Q. Is there any difference and if so what, between the cost of preparing the tongues which appear on this exhibit as a means of holding the spiral in place, and the kerfs or spurs which appear in the Vandenburgh patent for the same purpose? A. I think there would be no material difference in the cost of the labor of punching in
353 this manner as compared with the Vandenburgh structure, it is simply a matter of punching; one operation of a punch performs the work in both methods.

Mr. Johnston: I do not want to argue the case on the record, Master, but I think the Master will forsee the difficulty there is in obtaining direct evidence from competitors of their costs. It is well known that no court will order one concern to expose its costs to a competitor, and therefore I submit the witness' opinion as the best
354 evidence which I can obtain for that purpose. Whatever weight it may have, it is the best I can do at the present time.

Direct Examination closed.

355

Cross Examination by Mr. Edwards:

Q. How are the kerfs made with the Vandenburgh structure? A. The angle is passed through a punch, there is a set of dies, and as the angle passes through the punch the workman presses with his foot, releases the clutch and the die passes through the angle making a hole in the flange.

Q. Is the punch a rotary punch or a reciprocating punch? A. I don't know the difference.

356

Q. You do not know whether or not the kerfs are punched by being passed between rollers with projections and indentations? A. They are not passed between rollers.

Q. That much you know? A. I know that.

Q. But you do not know whether the punch reciprocates or whether it rotates? A. No, I don't know the difference between the two types of punch.

Q. How about the way in which the structure before you, Defendant's Exhibit D for Identification is made, is that made by a reciprocating punch or a rotary punch? A. I don't know.

357

Q. You never saw Exhibit D for Identification made, did you? A. No, I never did.

Q. You did not know what it costs to make it? A. No, I have no data on what the actual cost is.

Mr. Edwards: It is stipulated by and between the parties hereto that it is the custom of the defendant to give an order

358 number to each shipment, and such order numbers appear in the statement of account filed by the defendant in this case. Sometimes there are two order numbers which relate to one charge, when the shipments are on different dates then the order numbers are bracketed together. It is always one order number for one customer.

Adjourned subject to notice.

359 ———

Further hearing held at the office of the Special Master, at the Post Office Building, Park Row, New York City, June 17, 1920.

Present:

WILLIAM PARKIN, Esq., Special Master;

MESSRS. EDWARDS and GRIFFIN, for Plaintiff;

360 MR. JOHNSTON, for the Defendant.

Mr. Griffin: It has recently come to my notice, through investigations made subsequent to the receipt of your report, that a much larger amount of spiral steel re-enforcing than you have accounted for, has been sold by the Concrete Steel Company.

during the period of this accounting. I will, therefore, request that the case be re-opened upon the part of Plaintiff, and that Defendant be required to produce such additional witnesses from its bookkeeping and engineering staff as may be able to give me the information required concerning this additional spiral steel.

Mr. Johnston: I do not understand that plaintiff is entitled to an accounting of anything except the combination of the patent in suit; spirals alone are not that 362
combination, and we decline to give the information requested, certainly in the ambiguous and general form which is asked for at this time. So far as I know, all of the spirals which were made for use in the combination in the patent in suit are included in the account. I have been so assured by the defendant's accounting officers, and I do not know of anything further which should be accounted for. The call is so indefinite that I am not able to answer more specifically 363
now.

Mr. Griffin: At this time I demand from you a full and complete account of all spirals sold by your company for use with bars having integral prongs for attaching the spirals thereto, or for spirals sold by your company where you sold the bars separate from the spirals to be attached thereto by the persons purchasing the bars and spirals, and particular-

ly that you point out in the present account or supply a new account showing the amounts of spiral steel reinforcing of the type referred to in the injunction and decree in this case, where such sales were made to the Turner Construction Company, U. S. Army Base, South Brooklyn, U. S. Naval Base, Brooklyn Navy Yard, New York Belting and Packing Company, Passaic, N. J., Bridgeport Screw Company, Bridgeport, Ct., Kahen & Feldman, Wyckoff and Suydam Streets, Brooklyn, Otto Heineman Phonographic Supply Company, Newark, N. J., Julius Kaiser Building, Brooklyn, Standard Oil Company, Perth Amboy, N. J., William Steele & Sons, Philadelphia; and further, that you file a report showing the amount of spirals sold the Government or to any other person or contractor in connection with the construction of the Philadelphia Army Supply Buildings, the Army and Navy Supply Buildings at Boston, New York and New Orleans; and that you file a further report showing the amount of spiral steel reinforcing of the type referred to in the decree herein, sold to the Government for any of its army and navy buildings, all to cover the period of the accounting; and I further specifically request, in view of this information that has just come to my hand, that in the report to be hereafter filed, by your company, the name of the job to which the

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spiral steel reinforcing has been sold be indicated upon the report in order, that the truth or falsity of the report may be checked. I want the report also to conform to the old so that we can compare it by order number and so on.

Mr. Johnston: So far as the first call is concerned, that for all concrete reinforcing containing a spiral and a bar with integral spurs, I shall, of course, refuse to furnish any such information, as the Vandenburgh patent covers no such construc- 368
tion as that, and has been severely restricted by the courts. The devices in the Electric Welding suit, which have been held not to infringe, contain integral spurs.

So far as the call for information of devices furnished to the Government is concerned, it is obvious that counsel is not familiar with the statute and that that is a subject of an application to the Government for relief, to its Executive Department, or by suit in the Court of
Claims. The amendment to the statute 369
absolutely bars suit against contractors who furnish goods to the Government. That situation arose in the wireless cases and was dealt with by Judge Hough and afterwards by the Supreme Court of the United States; in view of the court's decision, Congress amended the statute to make the exclusive remedy of patentees against the United States so that we will

refuse to furnish any information whatever along that line.

The request that the names of purchasers be furnished has already been refused by the Master, and no permission has been given to reopen that subject.

The whole motion to reopen is objected to for want of notice, and for want of any support under oath whatever. The mere statement of counsel is wholly insufficient to justify a motion for reopening, which is a serious matter and is not 371 at all a matter of course after the defendant has practically concluded its testimony. On the contrary, there must be a verified showing, not only of facts but of diligence in ascertaining the facts.

So far as sales of spirals, which do not in themselves embrace the combination of the Vandenburgh patent, is concerned, we will refuse to furnish information. The sales which were made to persons who intended to assemble them in the Vandenburgh combination on the job, 372 were included in the report, as the stipulated testimony of Mr. McGee shows.

I believe that all of the items which counsel has called my attention to by his statement on the record, which is unsworn and insufficient as a basis for any action by the Master, are included in the account as filed. That is my information at the present time. I am assured by responsible officers of my client that they

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have twice gone over the books, the second time after finding that the first account had made improper allowances of costs, and that all of the spirals and spacing bars sold to be used together in the Vandenburgh combination, have been accounted for. Under the circumstances I think there is no showing for the Master's justifying the granting of any motion whatever to reopen or to state any new account.

Furthermore, counsel had ample opportunity, by examination and cross-examination to develop any errors which occurred. All of this could have been done at that time, and the fact is that the motion is fractious. 374

Mr. Griffin: In view of what counsel has said, and the admissions made by counsel, there is no necessity for a verified showing as to the facts of the defendant's not rendering a complete account. Counsel's own admissions showed the incompleteness of the previous account, and I now demand that it be made complete. 375

Mr. Johnston: General statements of that kind, Master, are of no value to you in determining the point. Our responsible statement is that we have accounted for every spiral and spacing bar sold to be assembled in the manner of the Vandenburgh structure, whether made in our shops or sent outside. For mere spirals alone we refuse to account because we

don't know how they will be assembled and we are not responsible for them.

The Master: I haven't looked at the statute and I do not know what the statute which you mention provides. I will look at that statute and decide on that.

Mr. Johnston: It is unfair to us to have Mr. Griffin put on the stand—let him furnish, by affidavit, the information on which he bases his statements and then we can investigate it and make counter affidavits if necessary. I cannot cross examine Mr. Griffin intelligently now unless I know the facts. It may well be that with the call he has put on the record to guide us, I may be able to have a full knowledge of all the facts, but if he puts in an affidavit which will cover when he found out these things and what the things are which he found out, and who is his authority for these statements, then I will have something to go on. As it is now, if he should go on the stand and put down all those things, I have nothing at all on which I can cross examine.

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The Master: I will defer his cross examination, to give you a few days to look it over.

Mr. Griffin: I will prepare the necessary affidavit and file it.

With respect to the statute counsel refers to, I have to say that in this case

the jurisdiction attached prior to the enactment of the statute, since the suit was filed prior to the declaration of war.

I will supply the affidavit and motion.

Adjourned to Wednesday, June 23, 1920, 10:30 A. M.

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Further adjourned to Friday, June 25, 10 a. m.

Met pursuant to adjournment, at the office of the Special Master, Park Row, New York City, June 25, 1920.

Present: The Master; Mr. Griffin; Mr. Johnston.

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The Master: What is your motion?

Mr. Griffin: This motion is that the case may be re-opened to the extent that defendant be compelled to account for the additional tonnage of spirals indicated in the affidavits filed heretofore.

Mr. Johnston: Is that all?

Mr. Griffin: That's all. Or that such further explanation be made by defendant

as will account for the additional tonnage of spirals indicated in the affidavits.

Mr. Johnston: Now, master—the first thing before the master is to determine whether any additional tonnage of spirals is indicated in the affidavits. There is nothing in any of the affidavits, Master, which shows that any of this work is outside of the account, not a word, not even an allegation that it has not all been accounted for. We take up the first one—first of all
383 before we go further, I will take the question of diligence in bringing the motion.

My brother Griffin says that the last time he was in New York was in October, 1919, after the filing of the account of the defendant herein, at which time he was advised that the account did not present items for large amounts of spirals of the type referred to in the decree herein. That is not a statement that defendant did not present all that should be presented, it is not a statement that anything which the defendant was advised of was not included in the
384 account; it was simply that it did not present items for large amounts of spirals. There is no showing at all that there was a large amount omitted; not even an allegation that there was anything omitted. It is true that defendant did not present items for large amounts of spirals, because they did not exist in the books of the defendant and there is no showing that they had exist-

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ed. Furthermore, that was October 1919; the case was closed in February 1920. In other words, the matter was allowed to rest in that situation for more than 4 months and nothing was done about it. I want you to take note of the character of these allegations in the affidavit, "not until his return in June, 1920, did he learn from reliable authority"—in other words, my brother has gone around, made inquiries and people have told him certain things; that is hearsay, and is objected to on that ground. 386
None of the people have verified what they said to him. Furthermore, he has stated that he was "informed by persons who were also asked to supply spirals on the buildings"—that is to say, defendant's business competitors. That is hearsay also, and of hostile people—defeated contractors; you know what that kind of gossip is. There is nothing in this affidavit that is not hearsay—tertiary rumor—not even hearsay.

Now as to these various items; we have 387
been wholly unable to find out about them, except in two cases because of the failure to give us the people to whom the goods were shipped. William Steel & Sons is a definite firm, that we were able to look up because goods were shipped to them directly and I find there were 20 items of infringing construction shipped to them, which are included in the account; also several

hundred tons of steel shipped to them not included in the account because it did not embrace the Vandenburgh construction; some of it was coils of wire from which spirals can be made, or Havemeyer bars, which are not involved in this account. The patented construction of Mr. Havemeyer differs in every respect from this and is not alleged to infringe; others were plain steel strips. Now my brother says there were 250 tons
389 of spirals—he doesn't give the source of his information—shipped to William Steel & Sons but he doesn't allege 250 tons of the Vandenburgh structure. In the call which my brother put upon the record he called for information regarding all structures having integral spurs, but our Court of Appeals has held him strictly limited to his one form shown and described, of a spur cut into the edge of a bar. Of course if it means that any form of spur were to be reported, that is beyond the Master's power
390 because it is not alleged that they infringe. The Court held that the broad claims which would cover such a construction are not valid and that is outside of the account. I won't say we have not made structures of that character, but all where a spur has been cut into the edge of the bar have been reported, and we have made no other form except the wire construction.

The Master: You say no other form except the wire construction or the one that is cut in the edge?

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Mr. Johnston: We have made the Vandenburgh construction on a small scale and when the injunction was issued that was discontinued, and since then no construction of that character has been made where the bar itself was used to secure the spiral on a form like the Electric Welding Company sample which I showed you, but our form is, and it has been the only one, where the spiral is wired in.

Now the Bridgeport Screw Company— 392
that was made before the re-issue date and of course was not to be accounted for under well known principles. That amounted to seven tons, my brother says, and he is correct in that much.

But the other things we do not know about. The method of keeping the books has been that the goods were sent to a contractor says John Smith of Brooklyn, New York, such and such a terminal, Wherever it happened to be, that would be all. Now the bill of lading would show just that; Smith himself would claim the goods at the 393
terminal and would take them wherever he chose, we do not know where they went or what became of them. Under the circumstances all goods going to Brooklyn went to a contractor and all goods that went to Philadelphia—shipped to Philadelphia—would go to a contractor. We have not the names of the contractors, we don't know and can't find out where the goods were used, that trouble runs all the way

394 through this thing. We don't for instance have an account with the "Army Base Building;" we have it with a contractor, and he may have that building and may have other buildings where goods went. As far as the Army Base Building is concerned, our information is very imperfect; we have not been able to run down just what went there; but we have heard—just as my brother Griffin has from other people —that what was shipped to the United
395 States Army Base Building was coils of wire not attached to anything. Of course we are not responsible for that. I believe a good deal of that was shipped.

Now you see what my brother has done is this: he has gone around and found a building that used say 150 tons, he cannot find an item of 150 tons in the account then he says we have not reported that building. But take William Steel & Sons. On my copy of the affidavit I have a memorandum of the various items of Vanden-
396 burgh construction, all of which are reported and amount to 104,000 pounds, William Steel & Sons, but they vary from 231 pounds up to 18,000 pounds, single shipments. It is impossible to come to any conclusion that way. Mr. Griffin's affidavit shows that was contained in the memorandum which I have filed with you, at the end of it:

(Reading from affidavit.)

Now the method of keeping the books has been of course to charge the contractor with so much money and to credit him with so much paid for, and that is all that is shown on the individual ledger. There is no reason for putting on that ledger the amounts, the different amounts of steel—they would have to be gathered in the various shops at Youngstown, Philadelphia and other places—I think there is one other, I have forgotten where—now take Mr. Griffin's second affidavit: 398

(Reading from affidavit).

When? If since July 1st, 1919, of course we are not accountable. It is not alleged that the stuff which was sent infringed the Vandenburgh patent.

(Reads further from affidavit).

Were attached—when, where, by whom?

(Reading) "which spiral steel deponent was advised by one Major Foster"—who is Major Foster, why is his affidavit not produced? What was the source of his information? Was he in charge of the work or 399 not? That's rubbish to put in stuff like that. "That said official also informed deponent that the Concrete Steel Company, defendant herein, also furnished the spiral steel," * * *" It has a right to furnish spiral steel. There is no allegation that the spiral steel according to the Vandenburgh patent was attached to spacing bars having the bars kerfed—not even an allegation, only hearsay proof.

(Reading).

I suppose that means four spacing bars for spirals—how were they attached, when, where and by whom? If not by us or furnished by us, we are not accountable to my brother for that.

(Reading) "That many other plans of concrete buildings are on file in said department * * *" Is that a statement from my brother as to where his information was derived? What of it, if so?

401 "Spirals of the type covered by the decree herein." That would mean more if my brother had shown by his call for all of the spirals attached by integral spurs what he was giving as the scope of the claim—I don't know if he means spirals which infringe the Vandenburgh patent or spirals which do not—the court has refused to uphold the contention that all integral spurs are covered—

Mr. Griffin: At this point, may I say I am perfectly content to rest the call upon

402 the decree.

Mr. Johnston: On the wording of the decree?—I am not. The call will have to rest upon the wording of the decree as determined by the opinion. That is elementary. The decree doesn't mean any kind of integral spur, it means the kind set out in the opinion of the court.

(Reading further from affidavit). "That it would require several weeks of search-

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ing to enable all of the data with respect to the large quantities of spiral steel reinforcing used in the government buildings to be obtained." Well, what of it? It isn't up to us to do that searching. It is up to my brother to prove his case. That is the weak point of all this contention, having months to make this search, having a representative here in New York who could get it for him if he was not here, he hies himself away to San Francisco until we have redistributed all the 404
data from which search was made in our files, sent it to the people to whom it belonged, then he wants us to go over it a third time. The request is utterly unreasonable.

I want the master to note very particularly the generality of these allegations; "large quantities of steel which are not shown in the account filed herein." Certainly we have sold millions of pounds of steel not shown in the account, but not steel according to the Vandenburgh patent, 405
that's a very small matter in our business, comparatively. Our sales, for example, of the Havemeyer bars represent possibly a thousand times all the Vandenburgh construction we have ever made, and other characters of steel which we sell for reinforcing.

The Master: Is the Havemeyer bar a bar for spiral?

406 Mr. Johnston: No, sir, nothing to do with it, a bar made of heavy section in a particular way so as to take hold of concrete, but has no spiral in the construction at all.

Now take up this sheet particularly (page 2 Mr. Griffin's affidavit of June 18), the allegation is made "upon the detail prints of several of the buildings referred to on the print herewith the name of the Concrete Steel Company occurs * * *" and further general allegations about
407 other buildings. The master can go over this sheet particularly.

The Master: I have.

Mr. Johnston: You will find there is not one item on there which mentions the spiral reinforcing, this is a mere makeweight and has nothing to do with the case. If any other complaint showed spiral reinforcing according to the Vandenburgh patent, that would be perhaps suggestive (but not conclusive) that that type of spiral reinforcing was used in the building. That's the weak
408 point of this whole thing. If my brother had said, "I went down to such a place and saw such a building which was erected during the accounting period, and which has Vandenburgh reinforcements in it, which I saw myself," and make some sketch showing what he saw so that you can see for yourself it is the Vandenburgh reinforcement, then produces affidavits to verify the question of date, and produces authoritative statements from someone who knows

that that was furnished by my client, and then show somehow or other—how I don't know—that it was not included in the account, you have something before you; but on the present showing the affidavits are as full of holes as a buckskin undershirt. There is nothing to them except rumor. My brother is suspicious that the account doesn't show all that was made and our people swear that it does, of the Vandenburgh reenforcement—it is a small part of their business. Their total sales are millions of pounds a year of steel. There is no showing before the Master for re-opening at all. My brother's fundamental error is in thinking that the Master will call for repeated accounts from us—that is not true. We have filed our account and when that was found to be erroneous by ourselves—no, it was by me—I corrected it by another new account, which necessitated going over it from one end to the other, and that corrected account stands. My brother has had his day in court to show what was not right by the testimony of the men who made the account. They were here, ready to be cross-examined, if necessary. Who did he call? First the sales agent, Mr. Barbour. Mr. Barbour's examination was devoted to showing not what was in the account, not to showing any error in the account or that it was correct, but to trying to find out

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from the man who was a mere sales agent, what the company was then making, although we were perfectly willing to furnish samples of what the company was then making, and as a matter of fact did so; and then called Mr. Bahr who prepared the account and every question he answered fully, some of the questions he could not answer, and the Master gave him an opportunity to investigate and come again and answer, which he did. The trou-
413 ble was that the gentlemen did not take the trouble to go into the account with any thoroughness at the time when they were bound to do so. Now, when counsel says "plaintiff rests," that is not mere social conversation; it is a formal and deliberate statement that the plaintiff has closed his case, and it is now for the defendant to put in his testimony to show that plaintiff has not made a case, or to controvert such case as he has made.

Not one of these things is there which
414 could not have been investigated to the extent that it has been investigated and made the basis of further examination of witnesses, but what had occurred and was known to counsel then. The statement that he did not discover them till June doesn't show that he made any effort to discover them; when he says he was advised in October that the account was incorrect. My brother filed with me or sent me by mail a copy of the affidavit by Mr. Vandenburgh. Mr.

Vandenburgh falls into much the same error as my brother did, and I assume my brother assisted him, as was natural, in the preparation of his affidavit. 415

(Reading from affidavit) "That within the last week he has ascertained from Roslyn Supply Company that the spirals referred to were made by and purchased from the Concrete Steel Company." Made by and purchased from the Concrete Steel Company is the allegation; but how am I to investigate the knowledge of a corporation informed about a corporation. That is purely secondary evidence on the part of Mr. Vandenburgh. I don't know what building he has reference to at 15th Street and Vermont Avenue, Washington. I would not wonder if he meant the building at the corner of H Street which many people mistake for 15th Street, but we don't know from that to whom the steel was shipped or what it was. It is not shipped to a job, it is shipped to a man, and he takes it to such job as he may be advised. 416

Further he says: "a large amount of spiral concrete reinforcing such as is covered by the decree in the above entitle action." Is Mr. Vandenburgh under some misapprehension as to what is covered by the decree? If it is any form of integral spur including wire construction, why he should say so. There is no statement, there is no pinning it down to construction. 417

418 If I may summarize my objections, Master, to this: in the first place there is no diligence shown in acquiring the information; second, there is nothing in the information which shows that any statement in the account is incorrect, or that anything has been omitted from the account which should have been included therein; that there is no allegation to that effect, and certainly no proof; third, that what is in these affidavits is almost entirely hearsay and
419 much of it is impossible to run down, because the names of informants even on hearsay, are not given, nor are their affidavits produced. The thing hardly amounts to hearsay because, these people not being produced, you cannot say whether they are given information of things they know, or things which someone has told them. Very often people who are not lawyers imagine that what they have heard someone say who ought to know, is their own knowledge. In the current
420 Law Journal for June 19, 1920 page 1006, the City Court said about a motion which has some analogy to this: (Reading from Law Journal). The curious part of it is that the Judge who decided that didn't give the name of the case in which he was rendering a decision, but it is in the last column on page 1006.

I have cited some other cases in my memorandum which show the character of

the evidence that should be brought before you. What should be done was to have produced some form of a drawing with the testimony of some respectable person that that drawing showed matter which was not included in the account and which infringed the Vandenburgh patent embodied in some structure at some definite place which could be investigated. Not a single instance is given. It seems to me the motion lacks any vertified showing at all. 421

Mr. Griffin: I have nothing further to say, I am not endeavoring to cumber the record. I am content to rest as the matter stands. 422

The Master: I don't see that you have made out any case that would justify me in opening this case and calling upon the defendant to furnish a further account.

Motion denied. Have you closed your case now?

Mr. Johnston: I hope to close certainly the first part of the week, if I can get a witness I have in mind who is in New York and whom I have been trying to get. If I can't I will have to go to Pittsburgh a second time to get him. It is due to a misunderstanding on his part that I have been unable to get him. 423

Mr. Griffin: I would like, inasmuch as Mr. Johnston has indicated that he will close his case at an early date with the testimony of the witness with respect to the construction at issue in the Pittsburgh case,

424 *Alexander M. Bell—For Plaintiff—Direct.*

I would like at this time to take my rebuttal testimony and finish the case as far as I am concerned now, subject to such additional rebuttal testimony as I might find necessary to put in, owing to such testimony as Mr. Johnston might develop.

The Master: I think I will do that Mr. Johnston, it will save time and cannot do any harm.

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ALEXANDER M. BELL, being duly sworn and examined as a witness for the plaintiff testifies as follows:

By Mr. Griffin:

Q. Mr. Bell, what is your occupation? A. Assistant Clerk, United States Court of Appeals.

Q. And as such Assistant Clerk do you have
426 charge of the records and models that are filed with the Clerk? A. Yes, sir, not filed, left with him.

Q. I will show you a model and also a copy of patent 1,159,297 and ask you if you recognize ever having seen the construction indicated in the patent in the model? A. I don't believe I could identify the article you show me, but I have seen something very similar.

Q. In what case? A. The case of Vandenburgh against the Concrete Steel Company as

far as my recollection goes, I think that's the title.

Q. Do you recognize the similarity between the patent drawing and the model I am showing you? A. I don't know that I have ever seen the patent drawing before.

Q. You know something about drawings? A. Yes.

Q. Do you recognize the similarity between the construction of the model and the construction indicated in the drawing? A. Yes, I think so.

Q. It appears to be the same thing? A. Yes, 428
as far as my knowledge goes.

Mr. Johnston: Master, I don't think it is competent to examine Mr. Bell on patent drawings, as things of that character are not within the scope of his duties—the question of identity of records is a different matter.

The Master: Are you objecting to the testimony?

Mr. Johnston: I object to any question which assumes expert knowledge on the 429
part of the witness—questions of identification are a different matter, I don't object to his identifying anything he has seen.

Q. Do you remember one of the small models filed in the Vandenburgh case, similar to this model I have just shown you? A. I remember an exhibit being left something similar to the

430 *Alexander M. Bell—For Plaintiff—Cross.*

model you show me—the exhibits are never filed here, Mr. Griffin.

Q. Do you know what became of that particular exhibit? A. Well, I know some exhibits were removed by the firm of Emery, Varney, Blair and Hoguet.

Q. Do you know whether this particular one was removed or not—the small model, plaintiff's exhibit 5 on the trial of the case? A. As far as my recollection goes, the large one over there and the small one—

431 Q. What became of the exhibits in the case? A. The exhibits were removed on June 4, 1919, by the firm of Emery, Booth, Janney & Varney.

Q. How did you determine that? A. I have a memorandum on the docket on my calendar that I keep.

By the Master:

Q. When did you make the memorandum? A. When they took them away, Mr. Parkin.

432 *Cross Examination by Mr. Johnston*:

Q. On what do you base your statement that the exhibits were delivered to my firm? A. Somebody came and asked me to give them the exhibits, from that firm.

Q. You have no independent recollection of the firm to which it was delivered, that is, you made a memorandum of some kind in accordance with your duty and you rely on that for your recollection? A. That's all.

433 Q. As to defendant's exhibit No. 6, I understand that you cannot identify the exhibit which my brother has just showed you—is that exhibit No. 6? A. I cannot identify it, no sir, only by saying it was something similar or almost the same size, it may have been smaller, I doubt whether it was larger than that.

Q. Do you recollect the messenger who came for the things? A. I do not.

Re-direct Examination by Mr. Griffin:

434 Q. You say you cannot identify it, you know, however, that it consisted of a series of spirals and wires? A. Yes, I will say it looked like that to me.

Q. It looked like it—it apparently had two bars of some kind? A. I couldn't go as far as that, I don't remember every exhibit in every case.

Q. So far as you know, it looked exactly like that? A. Something like that, yes.

Q. Was it shorter or longer? A. I couldn't say, it might have been shorter, I don't believe any longer.

435 Q. But about the size of the model I show you? A. Approximately.

By the Master: Q. How do you know it was the firm of Emery, Booth, Janney & Varney? A. Whoever came said they were from the firm of Emery, Booth, Janney & Varney.

436 Mr. Johnston: I have no objection to the master as master taking judicial notice of anything that went on in his office as Clerk of the Court. Since this situation arose informally at the last hearing, I have investigated in my own office, my two messengers, A. Barry Marten and Philip Everett, both told me they have no independent recollection of taking any exhibits from the office of the Clerk here, and that they are both certain they did not
437 bring to our office any coil of wire of the character just indicated, but the months which have elapsed have been filled with similar duties on the parts of the same messengers at different times and of course their recollection is necessarily vague in such a matter as this. None of us, I believe, attached any particular importance to the physical exhibits of this character after the court was through with them and they may have been removed and destroyed, but we have no knowledge of them over in my office.

438 Mr. Griffin: I doubt whether it ever did come to your office because I got this one down in the office of the Concrete Steel Company afterwards, but in order that the record may be straight, and in view of the showing that the models were delivered to counsel for the Concrete Steel Company, I now demand the production of that model from counsel.

Mr. Johnston: As already indicated, I have exhausted my resources in searching for it and while I would gladly comply with the demand if I could, I cannot do so.

On the other hand, I shall object to the consideration of the model if found because insufficiently proved. There is no statement in the original printed record on page 16 thereof which amounts to proof of the construction.

Mr. Griffin: I will offer in evidence Turner patent No. 1,159,297, dated November 2, 1915, and will refer to it presently. 440
I ask to be sworn.

CARLOS P. GRIFFIN, being duly sworn and examined as a witness for the plaintiff, testifies as follows:

I am principal counsel in this action and as such counsel have had entire charge of all of the matters connected therewith, save such as were handled by my associates. At the time of 441
bringing the original actions against the Electric Welding Company and Concrete Steel Company, I had two models, both of which were made by the Electric Welding Company and one of which I had changed to correspond with the one I filed in the Electric Welding Company suit. That

model consisted of a spiral coil of wire secured to two spacing bars by means of prongs projecting from the margin of the bar. Both models were then substantially the same length, but one was larger in diameter than the other and were substantially identical in construction. The larger model which was actually made and finished by Electric Welding Company, I cut in two parts, one part was filed in the Electric Welding Company case at Pittsburgh and the other part was filed as plaintiff's Exhibit No. 6 in this
443 action. This second model which I now offer in evidence before the master and ask to have marked Plaintiff's Accounting Exhibit No. 5, as far as construction goes, is an exact duplicate of the construction I offered in evidence in the Electric Welding Company case, except that it has a few more spirals and is not quite so large in diameter, and that model is substantially a duplicate of the construction shown in figure 2 of the patent to C. A. P. Turner, No. 1159297, November 2, 1915, which patent has a claim covering that construction.

444 The model is marked Plaintiff's Accounting Exhibit No. 5.

Mr. Johnston: The construction shown in Plaintiff's Accounting Exhibit No. 5 differs from the patent in that the spurs on the exhibit are in the same line while those in the patent are shown staggered —does it not?

Mr. Griffin: Yes.

Mr. Johnston: Otherwise substantially identical, as I understand it.

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If the Master will rule that these two exhibits shall be available to me in defendant's proofs without further offering them in evidence on my behalf it will save a little time, and I presume my brother Griffin will make no objection.

Mr. Griffin: I offer the sketch in evidence.

It is marked Plaintiff's Accounting Exhibit No. 6.

The Master: Those exhibits will be available to you.

446

Met pursuant to adjournment, at the office of the Special Master, Park Row, New York City, June 28, 1920, at 2 P. M.

Present as before.

Mr. Edwards waives notice of the taking of testimony in Pittsburgh.

447

The Master: Mr. Johnston, I will give you until July 10, 1920, to get your proofs in. I will close the case on that date.

Mr. Edwards, I will give you until July 21st, to file your brief, and will give Mr. Johnston until August 1st to file his reply brief, and then Mr. Edwards can have until August 15th to reply to Mr. Johnston's brief.

(The plaintiff made no requests to find).

DEFENDANT'S REQUESTS TO FIND. 601

PRAYERS AS TO DAMAGES.

I.

The Master finds as a fact that plaintiff has not shown by any evidence in this case that it has suffered any damage from infringement of the letters-patent in suit by the defendant in this case.

II.

The Master finds as a fact that the plaintiff is 602
not engaged in the manufacture and sale of the concrete reinforcing such as is described in the letters-patent in suit, and has suffered no damages by reason of any competition of the defendant in business of the character indicated.

III.

The Master finds from all the competent and material evidence in the case, and he so reports the fact to be, that no established rate of royalty for the use of the invention described in the letters-patent in suit has been shown by the plain- 603
tiff.

IV.

The Master finds, and so reports the fact to be, that the plaintiff has not shown by any competent and material evidence in this case what would be a reasonable royalty for the use of the

invention described in the letters-patent in suit; and that the evidence on behalf of the plaintiff is in such conflict that he is unable to determine therefrom what would be a reasonable royalty for the use of the invention; and that the weight of evidence, giving due regard to the qualifications and experience of the witnesses, both on behalf of the plaintiff and on behalf of the defendant, leaves wholly undetermined the fact that any royalty whatever would have been agreed upon and paid either by this defendant or by any other
605 person in the trade for the use of the said invention described in the letters-patent in suit.

V.

The Master finds and so reports the fact to be that there were other methods in use at the time of the issue of the reissued letters patent in this case which were satisfactory to the trade and accomplished the purposes of the Vandenburgh construction described in the letters patent in suit in an efficient and workmanlike manner, and that there is no advantage provided in the Van-
606 denburgh construction over the constructions referred to; and he further finds as a fact that no reason is shown by the evidence in this case why any person or persons, including the defendant in this case, should pay any royalty whatever for the use of the Vandenburgh construction.

607

VI.

The Master finds, as a conclusion of law from all the competent and material evidence in the case on the question of damages, that plaintiff is entitled to nominal damages of six cents, and no more; under the rules of law laid down by the Supreme Court of the United States in the following cases:

Garretson v. Clark, 111 U. S. 121;

608

and by the Circuit Court of Appeals for the Second Circuit in

Tuttle v. Gaylord, 28 F. R. 97;
Hohorst Case, 91 F. R. 655.

PRAYERS AS TO PROFITS.

VII.

The Master finds as fact that there were concrete reinforcements in use in the trade other than in the form shown by the plaintiff which 609
were capable of efficient use, and which were in fact so used satisfactorily; and that there is no competent and material evidence in the case showing any financial advantage to the defendant from the use of the infringing concrete reinforcements over such other concrete reinforcements. Specifically the Master finds and so reports the fact to be that the forms of concrete

610 reinforcements designated briefly as the Third Circuit forms, which were referred to by the Court of Appeals for the Third Circuit in the case of

Vandenburgh v. Electric Welding Co., 263 F. R. 95;

and particularly described by the Court of Appeals on Page 97, beginning at line 20 and ending at line 43, were practical and reliable
611 forms of concrete reinforcement and are held by that Court not to infringe the letters-patent in suit; and that there is no competent and material evidence in the case of any advantage whatever of the plaintiff's patented structure over the form of concrete reinforcing described by the Court as above noted, which said form of concrete reinforcement was open to the defendant in this case to make, use and sell.

Other forms of concrete reinforcement, particularly the types known as wired reinforcements, were stated by the plaintiff's witnesses to be outside of the patent in suit and the Master
612 finds the facts so to be; and he further finds that there is no competent and material evidence in the case of any financial advantage from the use of the construction shown in the patent in suit over such other forms of concrete reinforcement.

VIII.

The Master finds and so reports the fact to be that there is no competent and material evidence

in the case that the sale of the concrete reinforcements by the defendant was effected or affected by reason of the so-called Vandenburgh combination disclosed in the patent in suit.

Specifically the Master finds, and so reports the fact to be that the sales were merely an incidental and relatively insignificant part of the total sales of the defendant, and that such sales were made in general in connection with sales of other and more important items and as an accommodation to purchasers of larger and more important items who desired to fill all their wants 614
from a single source.

IX.

The Master finds, and so reports the fact to be, that the plaintiff has given no evidence showing any apportionment of total profit of the defendant in the sale of the ironwork referred to in their report entitled "Plaintiff's Accounting Exhibit 4" between the ordinary manufacturer's profits from the sale of ironwork, and those due to the use of the invention of the patent in suit.
615

X.

The Master finds as fact that the plaintiff has given no evidence showing that an apportionment of profits in the way indicated in Prayer IX is impossible, either by reason of expense or difficulty, and as a conclusion of law thereon he reports that the defendant was under no duty to attempt to apportion profits.

616 *Defendant's Requests to Find.*

XI.

The Master finds on all the competent and material evidence in the case that no basis for apportioning profits between sales of ironwork in general and profits due to the use of the invention of the patent in suit has been laid.

XII.

Conclusions of Law on the Subject of Profit.

617

The Master finds, as conclusion of law from the evidence, that plaintiff is not entitled to any sum by way of recovery of profits from the defendant in this case earned by it from the practice of the invention set out in the claims in suit; under the rules of law laid down by the Supreme Court of the United States in

Dobson *v.* Hartford Carpet Co.,	114 U. S. 439
Dobson *v.* Dornan,	118 U. S. 10
Mowry *v.* Whitney,	81 U. S. 620
Black *v.* Thorne,	111 U. S. 121
618 Garretson *v.* Clark,	111 U. S. 122
Coupe *v.* Royer,	155 U. S. 565
Rude *v.* Westcott,	130 U. S. 152
Spalding *v.* Mason,	161 U. S. 375

And in the Courts of this Circuit in

Tuttle *v.* Gaylord,	28 F .R. 97
Hohorst Case,	91 F. R. 655
Roemer *v.* Simon,	31 F. R. 41

XIII.

Conclusions of Fact and Law on the Whole Case.

The Master finds as conclusions of fact and law from all the competent and material evidence in the record of the whole case; that plaintiff is entitled to a decree for six cents damages, no profits, and its costs up to and including the interlocutory decree; and that defendants are entitled to the costs of the accounting; under the 620
rule of law laid down by the Supreme Court of the United States.

622

Master's Report

UNITED STATES DISTRICT COURT,

SOUTHERN DISTRICT OF NEW YORK.

GEORGE E. VANDENBURGH,
Plaintiff,
vs.
CONCRETE STEEL Co.,
Defendant.
Equity No. 14-88.

623

By interlocutory decree entered herein on May 15, 1919 it was referred to me to take and report to the Court an account of damages sustained by the plaintiff and of the profits received by the defendant from the infringement of claims 3 and 5 of reissued letters patent No. 14182 granted August 15, 1916 to George E. Vandenburgh.

Pursuant to said decree the parties attended before me and I have taken the account. The evidence is submitted herewith and on such evidence I report as follows:

624 The patent relates to a reinforcing bar for cement and concrete construction. The claims 3 and 5 were held not infringed by the lower Court. In the Court of Appeals, however, it was held that these claims were valid and infringed by the defendant. The claims are as follows:

3. A reinforcing bar provided upon one edge with a series of kerfs, each having an integral overlapping spur and a coil disposed in said kerfs. Each convolution thereof being retained beneath one of said spurs.

5. A reinforcing bar provided upon one edge with a series of kerfs disposed diagonally to the length of the bar. Each having an overlapping integral spur projected toward the center of the bar and a coil disposed in said kerfs and retained beneath said spurs.

The article in question consists of a cylindrical 626
helix or spiral of steel wire with one or more angle bars inside of it. These angle bars have kerfs cut in one edge in which the coils of the wire are set so as to keep the coils in position. The overlapping spur of the kerf can be forced down on the wire and hold it rigidly in place.

The patent was before the Third Circuit in *Vandenburgh* v. *Electric Welding Co.* 263 F. R. 95. The lower Court there held the patent invalid and dismissed the bill. In the Court of Appeals it was held that the claims were not infringed, the Court saying that coils and bars were old and mere attachment of the two was also 627
old; "and Vandenburgh's advance consisted, not in bar and coil attachment generally but in the kerf and spur attachment."

In the present suit the decision of the Court of Appeals is to the same effect. The Court refers to the admission of the defendant's wit-

ness Cummings that the plaintiff's form of reinforcing structure was new in cement work. Cummings says that prior to 1907 and 1908 the only knowledge he had of spirals with integral fastenings was what he obtained from books; that prior to that time contractors used wires to secure the spirals to longitudinals. In construing the claims, the Court of Appeals says: "So construed the claim describes a continuous spiral rigidly and integrally connected with kerfs and spurs in the bar constituting a truss-like struc-
629 ture within the body of the concrete and which can be more cheaply manufactured than if the spirals were riveted or welded to the bar at each point of contact." The comparison is between spirals riveted or welded at each point of contact and those connected by kerfs and spurs.

Plaintiff in his brief says that as the articles sold consisted of the series of elements recited in the claim, all the profits were due to the invention. The language of the claim does not control the accounting for profits;—that depends upon the contribution or step in advance which the pat-
630 entee has made in the art. *Dunn Mfg. Co.* v. *Standard Computing Scale Co.*, 204 Fed. Rep. 617; *Herman* v. *Youngstown Car Mfg. Co.* 216 Fed. Rep. 604.

In this view of the case it is one falling under class (d) of the classification in *Westinghouse* v. *Wagner* 225 U. S. 604, and it was the duty of the plaintiff to apportion the profits between those due to the patented feature and those attributable

to the unpatented part, or to show that such apportionment is impossible by reason of the defendant's acts.

The plaintiff has made no effort to work out an apportionment or to show that one was difficult or impossible. According to his evidence the only other method of attachment open to the defendant at the time of the infringement was by wiring them together, and in connection with a claim for a reasonable royalty, the plaintiff has introduced estimates by experts as to the comparative cost of the two methods, showing a large 632
saving by the Vandenburgh method. But these estimates give no basis for an apportionment for the reason that it does not appear what, if any, part of this saving went to the defendant.

According to Professor Thayer, one of plaintiff's experts, when wiring is employed, the spirals and bars are shipped separate and assembled on the job;—field assembly it is called. Who pays the cost of this, whether the manufacturer or contractor is not stated. In the defendant's work where four bars are used in reinforcement as is required by most building laws, two of the bars are inserted at the shop, 633
but not rigidly attached, the coils are pressed down so as to lie flat and then shipped to the job where the coils are set up again and the other bars inserted and the spurs hammered down on the coils. The cost of the assembling done by the defendant is given in the defendant's testimony, but there is nothing to show that the defendant made any profit from saving in labor. Mr. White

another of plaintiff's experts says that he does not know who makes the profit, the manufacturer or the contractor.

So far then as making any apportionment of the profits between the patented and unpatented features is concerned, the plaintiff has wholly failed to sustain the burden of making such apportionment and it would be necessary to report that there was no evidence of the profits made by the defendant, were it not that in my opinion, the evidence shows that the whole value
635 of the defendant's structure as a commercial article lay in the patented feature and that all the profits from the sale of the article were due to it. The evidence on which this conclusion is based was not introduced specifically for the purpose of establishing this point, but as it is in the case, it is necessary to consider it.

On the trial of the case Professor Thayer said that the competition in concrete reinforcing was so great that anything which cost more money than some other method went right out of existence. Cummings, the president of the Electric Welding Company, whose patent for reinforce-
636 ment by hoops is in the record, says that hoops could not compete with spirals because of the greater expe[illegible] Bruce Clark White, one of the plaintiff's ex[illegible]s, says that at the time of the infringement t[illegible] only method of attachment open to the public was the old system of wiring. He says that he had never used the wiring system personally nor seen it used in any practical way.

There were other methods of attachment, but they were covered by patents.

Mr. White estimates the cost of attachment by wire at $40 a ton and the cost of attaching by the Vandenburgh method at $4. He is very cautious in his statement, saying that without a complete layout of column bars, pitch of spiral and other particulars which would affect the cost, it is impossible to make a close estimate. His estimate of $40 a ton is based on an assumed structure given by plaintiff's counsel which, the witness says, would be exceptional. As to another as- 638
sumed column, he gives the respective costs as $15 and $1. Professor Thayer gives the costs as $13 and $3 respectively. Both witnesses assume field assembly for the wiring system, and partial shop assembly for the Vandenburgh system.

The defendant's cost accountant, Weber, says that the actual cost of assembling the defendant's structure was $4.88 per ton. The defendant devised a system of wiring which cost only $5.52 a ton, but this was after the injunction. He thinks the estimates given by White and Thayer excessive and that the cost would be nearer $4
than $40, but on cross-examination admits that in 639
criticising White's figures he had in mind only this system devised by defendant after the injunction. The witness says this had been sold in a number of instances, but to what extent and how it compared with the infringing structure in efficiency does not appear. As it was not known at the time of the infringement and only devel-

oped later it must be disregarded as a standard of comparison. *Expanded Metal Co.* v. *General Fireproof Co.*, 247 F. R., at p. 910.

The difference in cost between the old method of wiring and the Vandenburgh method would be prohibitive to the former. No builder would buy reinforcement which required such an expensive method of attachment when there were cheaper ones to be had. Even the difference in cost of the defendant's wiring system, 74 cents a ton, might be prohibitive in large contracts.

641 The defendant says that the structure involved in the suit against the Electric Welding Company was open to it. There was some dispute as to what this structure was, the exhibit having been lost. The opinion of the Court says that the bar used in that structure was a channel bar with a tongue stamped out of the solid central back portion, which tongue was wound over the coil. Plaintiff's counsel claimed that the bar was an angle bar, and that it was covered by a patent to Turner No. 1159297. This patent, while it says that the bars are preferably of angle iron, does

642 not so limit the construction and would cover either channel or angle bars. Defendant says that under *McCreary* v. *Canal Co.*, 141 U. S. 459, patented structures are to be considered as open to the defendant.

But the case does not so hold. The Court was considering a case where an earlier patent than the one sued on was claimed to be owned by the plaintiff and excluded from defendant's use, but the opinion expressly says that a patent owned by

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a third party would present a different question. Whether or not such a patent is to be considered as open to the public depends upon whether it is held a close monopoly or its use is available at a price. *American Pneumatic Service Co.* v. *Snyder,* 241 F. R. 274. There is no evidence that the use of the patent or any of the patents for attaching spirals and bars was available to the defendant and Mr. White's statement that the only method open at the time of the infringement was the old method of wiring, stands uncontradicted.

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The case then comes within class (b) of the classification in *Westinghouse* v. *Wagner,* supra, and the line of cases of which *Wales v. Waterbury,* 101 F. R. 126, *Mfg. Co.* v. *Cowing,* 105 U. S. 258, *Crosby Valve Co.* v. *Safety Valve Co.,* 141 U. S. 441 and *Mainim* v. *Union Special Mach. Co.* 187 F. R. 123 are samples, where the patented feature gives the whole value to the structure and the patentee recovers all the profits made from its manufacture and sale.

The account brought in by the defendant on the plaintiff's motion contains a list of all the infringing spirals and bars sold by the defendant for use in reinforcing concrete. As finally amended, it showed a net profit on the total business of $1826.12. It is made up of many items on some of which there was a profit and on others a loss. According to an appendix to plaintiff's brief, which is apparently not questioned by the defendant, the profit on the profitable sales aggregated $18982.13 and the plaintiff claims to recover this amount as profits. That the profits may be

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recovered and the losses disregarded is settled. *Crosby Valve Co.* v. *Safety Co.*, 141 U. S. 441, *McKee Glass Co.* v. *H. C. Frey Co.*, 248 F. R. 125; *Canda Bros* v. *Michigan Malleable Iron Co.*, 152 F. R. 178, *Metallic Rubber Tire Co.* v. *Hartford*, 254 F. R. 860.

One objection is made by plaintiff to the account, viz., the item of interest on the investment. But it is settled for this Circuit that this is a proper credit to the defendant. *Oehring* v. *Fox Typewriter Co.*, 251 F. R. 584. The interest
647 charged is $4085.07 on sales of spirals aggregating $205591.62. The sales of spirals made at a profit amounted to $154293.35 and were 75% of the total. 75% of $4085.07 is $3063.80 which must be deducted from the profit above given, namely $18982.13. The remainder is $15918.33 and is the amount which the plaintiff is entitled to recover.

The total tonnage sold was 2411 tons and profits were made from the sale of 1684 tons of material. On the remaining 727 tons sold at a loss the plaintiff asks damages in the shape of a reasonable royalty. This he is entitled to if the
648 evidence is sufficient on which one can be computed. *McKee Glass Co.* v. *H. C. Frey Co.*, 248 F. R. 125.

Vandenburgh never made or sold any concrete reinforcement and never exploited his patent in any way. There are no damages from lost sales or reductions in price. The evidence as to the amount of a reasonable royalty is as follows: Mr. White, basing his conclusion on the difference in

labor cost between the patented method and the old method of wiring says that a royalty of $12 a ton would be fair and on the same basis Professor Thayer says $8. Fred T. Llewellyn, a witness for the defendant who is an assistant to the President of the United States Steel Corporation as engineer, and whose position and experience entitle his opinion to weight, says that royalties usually depend on the extent to which a patent has been exploited he instances $1.00 a ton for a bar for concrete reinforcement including the assistance of the patentee in marketing it. 650 He thinks the estimates of White and Thayer absurdly high, says 10% of the saving or the additional profit would be a reasonable measure of the value of the patent in view of the risk of non success assumed by the user. This is all the expert evidence on the subject.

Two licenses have been granted by the patentee. One of them, testified to by the plaintiff's counsel was for $3.00 a ton. It was to an infringer, the Concrete Steel Products Company, and was in part in settlement of past infringement. The testimony in regard to this contract 651 was given by the plaintiff on the trial and by his counsel on the accounting. The contract itself is not in evidence. It was the only license prior to the filing of the account and was subsequent to the reissue. The defendant put in evidence the other license agreement. It was made to the Corrugated Bar Co., October 3, 1919, after the decision in this Circuit sustaining the patent put before the decision in the Court of Appeals in the Third Circuit. The testimony in regard to it is

in the deposition of Albert L. Johnson the president of the licensee, taken on the accounting. The contract provides for a payment of $3,000 for past infringements and for an exclusive license in certain territory which included the greater part of the United States. A license fee of $3 a ton is to be paid, the minimum to be $125 a month to November 30th, 1921, and thereafter $300 per month. It contains a clause that if claim 3 of the reissued patent is held by any Circuit Court of Appeals to be invalid or to be insufficient to cover
653 the construction there in suit, all the obligations of the licensee shall cease and the license granted to it shall continue free and clear of all license fees and royalties. Under the decision of the Court of Appeals in the Third Circuit the obligation of the licensee to pay royalties for the use of the patent is at an end. In view of this contract it seems impossible to award any large royalty for the use of the patent.

But none of this evidence affords any basis for fixing the amount of a reasonable royalty. A reasonable royalty is the amount which one can afford to pay who desires to manufacture under
654 the patent. This is a business question and all the factors of cost and competition must be considered which would enter into the calculation of one who was about to make a contract for a license. *Consolidated Rubber Tire Co.* v. *Diamond Co.*, 226 F. R. 455; *Page Machinery Co.* v. *Dow Jones Co.*, 238 F. R. 369. In the former case it was said that the royalty "must leave room for the usual profit in the business together with the cost of production * * *." What the market will bear determines the license value or royalty.

655

Reinforced concrete has gone into extensive use in construction, and there were other devices such as that involved in the Electric Welding case and a method of attachment by staples clinched to the longitudinal bar, the cost of which Professor Thayer says would be about the same as the Vanderburgh method. To what extent these were used how far they came into competition with the plaintiff's structure and what advantage the latter has or what saving or profit, over the others is not shown, except that Mr. White says he considers the Vandenburgh meth- 656
od of great utility and the most valuable and practical one. On the other hand, Mr. Llewellyn says that the trade understanding is that the sale of spirals is frequently not profitable in itself but merely serves to assist in the sale of other concrete reinforcement. He further says that $5 a ton is a very satisfactory total net profit on steel for the concrete reinforcement.

In the *Consolidated Rubber Tire* case, *supra*, a manufacturing profit of 20% was said to be not unusual and in *Bemis Car. Co.* v. *J. G. Brill Co.*, 200 F. R., 749, a manufacturing profit of 10% was approved in estimating a reasonable royalty. In 657
the present case the manufacturing cost was about $80 a ton, so that the $5 a ton profit of which Mr. Llewellyn speaks would be less than 10%, and the actual profit made by the defendants was only about 75 cents a ton. On these figures there would be no room for any royalty at all.

I report that there is no evidence before me on which a reasonable royalty can be calculated.

658 The question whether the defendant's infringement was deliberate has been argued, and although the question is not involved if there are no damages the facts may be stated.

It is a stipulated fact that nobody connected with the defendant company ever saw a device of the character in suit which was built by plaintiff or by anybody associated with plaintiff; that the devices manufactured and sold by defendant, were designed independently by defendant and were not copied from anybody. It is further
659 stipulated that defendant had no knowledge of plaintiff's alleged invention or of plaintiff's original patent until the same was brought to its attention by a letter dated May 17, 1916, signed by C. P. Griffin, plaintiff's attorney.

This stipulation is in the record before the Court. From this stipulation it further appears that defendant immediately obtained a copy of the patent, examined it, wrote to its own attorneys that it did not think its structure was covered by the patent and suggested that they so write to Mr. Griffin; that the attorneys confirmed defendant's view, so wrote Mr. Griffin and de-
660 fendant continued to manufacture in the belief that it was free to do so.

On June 12, 1916 the defendant received a circular from Mr. Griffin showing a structure which defendant did not think was in accordance with the patent, but heard nothing from him until January, 1917, though in the meantime it heard of threats to other manufacturers. On January 3, 1917, it received a letter threatening suit if a settlement were not effected. The bill was filed

thereafter and proceeded through the Court of Appeals where the decision was rendered on April 16, 1919. The first account was filed on July 29, 1919.

The defendant without knowing of plaintiff's patent, in entire good faith devised a structure which unfortunately for it has been found to infringe. That it was a debatable question is shown by the decisions of the two lower courts in its favor. The defendant has shown in the proceedings before me no disposition to cause unreasonable delay or in any way harass or impede the 662
plaintiff.

In my opinion there is nothing on which to base a claim of wanton infringement. *Brown Bag Filling Mach. Co.* v. *Drohen*, 175 F. R. 576.

Respectfully submitted,

WM. PARKIN,
Master.

664

Plaintiff's Exceptions to the Master's Report

UNITED STATES DISTRICT COURT,

SOUTHERN DISTRICT OF NEW YORK.

GEORGE E. VANDENBURGH, Plaintiff, vs. CONCRETE STEEL COMPANY, Defendant.	Equity No. 14-88.

665

Now comes the plaintiff, George E. Vandenburgh, by his attorneys, Carlos P. Griffin and O. Ellery Edwards, and excepts to the report of the Master upon the ground herein set forth.

1. The report should find and set a reasonable royalty from the testimony adduced.

2. The report is erroneous in stating that none of the evidence affords any basis for fixing a rea-
666 sonable royalty.

3. The report is erroneous in not finding that the spirals sold by defendant were sold to assist its other steel business and that the losses should not be applied solely to spirals.

4. That the report is erroneous in not finding that a reasonable royalty is not less than seventy-four (74) cents per ton and should find a royalty not less than the license royalty of three ($3.00) dollars per ton.

5. That the report failed to find that the defendant should pay the cost of this reference.

6. That the amended report errs in that it allows the sum of Three thousand sixty-three dollars and eighty cents ($3063.80) interest on the 668
investment to be credited to the defendant when no such interest should be allowed to the defendant and no such interest should be credited.

7. That the amended report is erroneous in not finding that the plaintiff is entitled to recover interest at six per cent as to each item of profit in the statement of account filed by the defendant and in evidence as Plaintiff's Exhibit 3, because each such item is admitted by the defendant, is liquidated as to amount and definite as to date, and so as to each such item of profit interest should be allowed from the said date 669
admitted by the defendant on the said amount until payment is made.

8. That the amended report is erroneous in not finding that the plaintiff is entitled to recover interest at six per cent on the total amount of profit made by the defendant and admitted in Exhibit 3 from the date of filing said statement

670 *Plaintiff's Exceptions to the Master's Report.*

of account by the defendant as said amount due was then and there admitted by the defendant as a liquidated amount as of such date.

9. That the amended report is erroneous because the Master accepted the defendant's method of calculating interest on the investment, whereas this method was wrong for the following reasons, to wit:

671 1st. No showing was made by the defendant as to what capital was invested in producing non-infringing devices and what capital was invested in producing infringing devices.

2nd. There was no evidence to show that the infringing devices were produced by the same machinery, apparatus or other device that produced the non-infringing devices.

672 3rd. That no witness was called to show what non-infringing devices were made by the defendant during the time covered by the accounting and what machinery was used in producing such devices and whether or not it was the same machinery that was used in producing the infringing devices, so that it is impossible to determine from the record what part of the plant and equipment produced infringing devices and what part produced non-infringing devices, or to draw

any accurate conclusion of any kind whatsoever as to this matter.

4th. There was nothing to show how the capital and surplus was used in the business of defendant and what part of it was used in producing infringing devices and what part of it was used in producing non-infringing devices.

5th. That the method of averaging the aggregate capital and surplus employed in the 674
business of the defendant during the period of the accounting is an erroneous method because it is not shown that capital and surplus were actually employed in the business.

6th. That as in the present case the defendant's plant and real estate were used for several other and wholly different kinds of manufacture than the patented article and the evidence offered to distinguish between the profits derived from the use of the plant and real estate for making the patented article and those attributable to the other 675
sources of profit was not sufficient to enable the Master to make a satisfactory apportionment or allowance for interest on the investment.

7th. That as there were infringing and non-infringing operations conducted by the

676 *Plaintiff's Exceptions to the Master's Report.*

defendant and as there has been no evidence to show the extent to which it was actually employed in the infringing operations, there is no basis for the allowance of interest which may be deducted from the profits due to the infringing operations of the defendant.

8th. That the ratio between the total sales of the defendant to the infringing sales is not shown to be the ratio of the average
677 capital employed in the total business to the capital employed in the infringing operations, and therefore the ratio as to interest is erroneous for this reason.

CARLOS P. GRIFFIN,
O. ELLERY EDWARDS,
Solicitors for Plaintiff.

Dated, New York, November 27th, 1920.

679

Defendant's Exceptions to the Final Report of the Master

UNITED STATES DISTRICT COURT,

SOUTHERN DISTRICT OF NEW YORK.

GEORGE E. VANDENBURGH,
Plaintiff,
v.
CONCRETE STEEL COMPANY,
Defendant.

680

COMES Now the defendant, CONCRETE STEEL COMPANY, and excepts to the final report of William Parkin, Esq., Master in the following particulars:

1. To any award of profits in view of the Master's holding, page 4, that

> "It was the duty of the plaintiff to apportion the profits between those due to the patented feature and those attributable to the unpatented part, or to show that such apportionment is impossible by reason of the defendant's acts.
>
> The plaintiff has made no effort to work out an apportionment or to show that one was difficult or impossible."

681

682 *Defendant's Exceptions to the Final Report of the Master.*

and

> "These estimates (of plaintiff) give no basis for an apportionment for the reason that it does not appear what if any part of this saving went to the defendant."

And in view of his further finding, page 5, that

683 > "The spirals and bars are shipped separate and assembled on the job;—field assembly it is called. Who pays the cost of this, whether the manufacturer or contractor, is not stated. * * * There is nothing to show that the defendant made any profit from saving in labor."

and

> "The plaintiff has wholly failed to sustain the burden of making such an apportionment."

684 II. To the Master's finding that (page 6)

> "The evidence shows that the whole value of the defendant's structure as a commercial article lay in the patented feature and that all the profits from the sale of the article were due to it."

there being no evidence that any sale whatever, either by this defendant or by any other person, firm or corporation within the United States

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was effected or affected by reason of the patented combination; or that such patented combination was known to any purchaser whatever and considered by him or it as a reason for making the purchase or refraining therefrom.

III. To the Master's finding that

> "The difference in cost between the old method of wiring and the Vandenburgh method would be prohibitive." 686

as without evidence to sustain it because the same is restricted to a single method of attachment and based upon evidence of so-called experts founded upon estimates and without evidence of any actual costs incurred commercially; and in view of the Master's statement, page 13, that

> "There were other devices such as that involved in the Electric Welding case and a method of attachment by staples clinched to the longitudinal bar, the cost of 687 which Professor Thayer says would be about the same as the Vandenburgh method. To what extent these were used, how far they came into competition with the plaintiff's structure and what advantage the latter has or what saving or profit, over the others is not shown;"

688 *Defendant's Exceptions to the Final Report of the Master.*

the burden of proof as to these matters being upon the plaintiff and failure to show them being a bar to any recovery whatever.

IV. To the Master's holding, page 6, in effect that

> "only unpatented methods of attachment could be used as standards of comparison"

689

in view of the references cited in the answer proved in the trial of the case.

V. To the Master's failure to allow the entire interest upon capital invested as an offset to any profits found to have accrued, there being no authority in law for an apportionment of said interest.

VI. To the Master's failure especially to find the conclusion of fact, set out in prayer
690 No. I of the defendant submitted to him before the filing of his report as follows:

> "The Master finds as a fact that plaintiff has not shown by any evidence in this case that it has suffered any damage from infringement of the letters-patent in suit by the defendant in this case."

VII. To the Master's failure specifically to find the conclusion of fact, set out in prayer No.

Defendant's Exceptions to the Final Report of the Master. 691

II of the defendant submitted to him before the filing of his report, as follows:

> "The Master finds as a fact that the plaintiff is not engaged in the manufacture and sale of the concrete reinforcing such as is described in the letters patent in suit and has suffered no damages by reason of any competition of the defendant in business of the character indicated." 692

VIII. To the Master's failure specifically to find the conclusion of fact, set out in prayer No. III of the defendant submitted to him before the filing of his report, as follows:

> "The Master finds from all the competent and material evidence in the case, and he so reports the fact to be, that no established rate of royalty for the use of the invention described in the letters patent in suit has been shown by the plaintiff." 693

IX. To the Master's failure specifically to find the conclusion of fact, set out in prayer No. IV of the defendant submitted to him before the filing of his report, as follows:

> "The Master finds and so reports the fact to be that the plaintiff has not shown by any competent and material evidence

694 *Defendant's Exceptions to the Final Report of the Master.*

in this case what would be a reasonable royalty for the use of the invention described in the letters patent in suit; and that the evidence on behalf of the plaintiff is in such conflict that he is unable to determine therefrom what would be a reasonable royalty for the use of the invention; and that the weight of evidence, giving due regard to the qualifications and experience of the witnesses, both on
695 behalf of the plaintiff and on behalf of the defendant, leaves wholly undetermined the fact that any royalty whatever would have been agreed upon and paid either by this defendant or by any other person in the trade for the use of the said invention described in the letters patent in suit."

X. To the Master's failure specifically to find the conclusion of fact, set out in prayer No. V of the defendant submitted to him before the
696 filing of his report, as follows:

"The Master finds and so reports the fact to be that there were other methods in use at the time of the issue of the reissued letters patent in this case which were satisfactory to the trade and accomplished the purposes of the Vandenburgh construction described in the letters patent in suit in an efficient and work-

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manlike manner, and that there is no advantage provided in the Vandenburgh construction over the constructions referred to; and he further finds as a fact that no reason is shown by the evidence in this case why any person or persons, including the defendant in this case, should pay any royalty whatever for the use of the Vandenburgh construction."

698

XI. To the Master's failure specifically to find the conclusion of law, set out in prayer No. VI of the defendant submitted to him before the filing of his report, as follows:

"The Master finds, as a conclusion of law from all the competent and material evidence in the case on the question of damages, that plaintiff is entitled to nominal damages of six cents, and no more; under the rules of law laid down by the Supreme Court of the United States in the following cases:

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Garretson v. *Clark*, 111 U. S., 121,

and by the Circuit Court of Appeals for the Second Circuit in

Tuttle v. *Gaylord*, 28 F. R., 97;
Hohorst Case, 91 F. R., 655."

700 *Defendant's Exceptions to the Final Report of the Master.*

XII. To the Master's failure specifically to find the conclusion of fact, set out in prayer No. VII of the defendant submitted to him before the filing of his report, as follows:

"The Master finds as fact that there were concrete reinforcements in use in the trade other than in the form shown by the plaintiff which were capable of efficient use and which were in fact so used satis-

701 factorily; and that there is no competent and material evidence in the case showing any financial advantage to the defendant from the use of the infringing concrete reinforcements over such other concrete reinforcements. Specifically the Master finds and so reports the fact to be that the forms of concrete reinforcements designated briefly as the Third Circuit forms, which were referred to by the Court of Appeals for the Third Circuit in the case of

702 *Vandenburgh* v. *Electric Welding Co.*, 263 F. R., 95.

and particularly described by the Court of Appeals on Page 97 beginning at line 20 and ending at line 43 were practical and reliable forms of concrete reinforcement and are held by the Court not to infringe the letters patent in suit, and that there is no competent and material evidence in the

703

case of any advantage whatever of the plaintiff's patented structure over the form of concrete reinforcing described by the Court as above noted, which said form of concrete reinforcement was open to the defendant in this case to make, use and sell.

Other forms of concrete reinforcement, particularly the types known as wired reinforcements, were stated by the plaintiff's witnesses to be outside of the patent 704 in suit and the Master finds the fact so to be; and he further finds that there is no competent and material evidence in the case of any financial advantage from the use of the construction shown in the patent in suit over such other forms of concrete reinforcement."

XIII. To the Master's failure specifically to find the conclusion of fact, set out in prayer No. VIII of the defendant submitted to him before the filing of his report, as follows:

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"The Master finds and so reports the fact to be that there is no competent and material evidence in the case that the sale of the concrete reinforcements by the defendant was effected or affected by reason of the so-called Vandenburgh combination disclosed in the patent in suit.

Specifically the Master finds and so reports the fact that the sales were merely

706 *Defendant's Exceptions to the Final Report of the Master.*

an incidental and relatively insignificant part of the total sales of the defendant, and that such sales were made in general in connection with sales of other and more important items and as an accommodation to purchasers of larger and more important items who desired to fill all their wants from a single source."

707 XIV. To the Master's failure specifically to find the conclusion of fact, set out in prayer No. IX of the defendant submitted to him before the filing of his report, as follows:

"The Master finds and so reports the fact to be that the plaintiff has given no evidence showing any apportionment of total profit of the defendant in the sale of the iron work referred to in their report entitled 'Plaintiff's Accounting Exhibit 4' between the ordinary manufacturer's profit from the sale of iron work,
708 and those due to the use of the invention of the patent in suit."

XV. To the Master's failure specifically to find the conclusion of fact, set out in prayer No. X of the defendant submitted to him before the filing of his report, as follows:

"The Master finds as fact that the plaintiff has given no evidence showing that an apportionment of profits in the way indi-

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cated in Prayer IX, is impossible either by reason of expense or difficulty, and as a conclusion of law thereon he reports that the defendant was under no duty to attempt to apportion profits."

XVI. To the Master's failure specifically to find the conclusion of fact, set out in prayer No. XI of the defendant submitted to him before the filing of his report, as follows:

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"The Master finds on all the competent and material evidence in the case that no basis for apportioning profits between sales of iron work in general and profits due to the use of the invention of the patent in suit has been laid."

XVII. To the Master's failure specifically to find the conclusion of law, set out in prayer No. XII of the defendant, submitted to him before the filing of his report, as follows:

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"The Master finds, as conclusion of law from the evidence, that plaintiff is not entitled to any sum by way of recovery of profits from the defendant in this case earned by it from the practice of the invention set out in the claims in suit; under the rules of law laid down by the Supreme Court of the United States in

Dobson v. *Hartford Carpet Co.*, 114 U. S. 439;

Dobson v. *Dornan,* 118 U. S. 10;
Mowry v. *Whitney,* 81 U. S. 620;
Black v. *Thorne,* 111 U. S. 121;
Garretson v. *Clark,* 111 U. S. 122;
Coupe v. *Royer,* 155 U. S. 565;
Rude v. *Westcott,* 130 U. S. 152;
Spaulding v. *Mason,* 161 U. S. 375;

And in the Courts of this Circuit in
Tuttle v. *Gaylord,* 28 F. R. 97;
713 *Hohorst Case,* 91 F. R. 655;
Roemer v. *Simon,* 31 F. R. 41."

XVIII. To the Master's failure specifically to find the conclusion of fact and law, set out in prayer No. XIII of the defendant submitted to him before the filing of his report, as follows:

"The Master finds as conclusion of fact and law from all the competent and material evidence in the record of the whole case; that plaintiff is entitled to a decree of six
714 cents damages, no profits, and its costs up to and including the interlocutory decree; and that defendants are entitled to the costs of the accounting; under the rule of law laid down by the Supreme Court of the United States."

CONCRETE STEEL COMPANY,

By EMERY, VARNEY, BLAIR & HOGUET,
Solicitors and of Counsel.

715

Opinion, Knox, D. J.

UNITED STATES DISTRICT COURT,

SOUTHERN DISTRICT OF NEW YORK.

GEORGE E. VANDENBURGH,
Plaintiff,
against
CONCRETE STEEL COMPANY,
Defendant.
} E 14-88.

716

CARLOS P. GRIFFIN (O. ELLERY EDWARDS, of Counsel), for Plaintiffs;

EMERY, VARNEY, BLAIR & HOUGUET (THOMAS J. JOHNSTON, of Counsel), for Defendant.

KNOX, D. J.: Upon the accounting heretofore ordered, the Master has found plaintiff entitled to recover from defendant, by way of profits, the sum of $15,918.33. Each of the litigants has filed exceptions to the Master's report, and thus the matter comes before this Court.

717

Inasmuch as defendant contends that plaintiff should receive only a nominal award of six cents, I will first deal with the exceptions directed to that proposition.

718 *Opinion, Knox, D. J.*

The claims of the patent, held by the Circuit Court of Appeals to be valid and infringed, are:

> 3. A reinforcing bar, provided upon one edge with a series of kerfs, each having an integral overlapping spur and a coil disposed on said kerfs, each convolution thereof being retained beneath one of the spurs.
>
> 5. A reinforcing bar provided upon one edge with a series of kerfs disposed diagon-
719 ally to the length of the bar, each having an overlapping integral spur projected toward the center of the bar and a coil disposed in said kerfs and retained beneath said spurs.

That decision and one of the Court of Appeals of the Third Circuit have given the valid claims of the patent a rather narrow construction. In the latter case, reported in 263 Fed., 95, the Court said, " * * * Vandenburgh's patent" (for a reinforcing bar for use in concrete work) "made no impress in the art, and we give the patentee
720 the full measure of his disclosure and the protection of his claim by limiting his field of monopoly to a reinforcing bar with a kerf and an integral overlapping spur, as embodied in his third claim".

As construed by the Appellate Court of this Circuit, April 16, 1919, 258 Fed., 143, " * * * the claim describes a continuous spiral rigidly and integrally connected with kerfs and spurs in the bar constituting a trusslike structure within the

body of the concrete, resisting lateral and longitudinal strains, and which can be more cheaply manufactured than if the spirals were riveted or welded to the bar at each point of contact". Prior to 1907 or 1908, spirals or hoops for concrete work were attached to reinforcing bars by lapping to the bars, with wire, the convolutions of the spiral. This method of attachment was more or less laborious and expensive and not altogether satisfactory. There was, for example, evidence tending to prove that the latter method of procedure did not give an absolutely rigid attachment 722
of the spiral to the bar, or prevent the endwise slipping of the spiral thereon. Such method was also said to make it difficult to accurately space the spirals to get the best effect, and to have been a slow and expensive method of assembling, either in the shop or in the field. One witness testified that the cost of such attachment would be $40 per ton, whilst the cost by the patentee's disclosure would be but $4.00 per ton. This estimated cost, it is fair to say, was based upon an assumed column of unusual height; and, upon another assumed column, the cost was estimated in the ratio 723
of $15 to $1.00. Another of plaintiff's witnesses estimated the costs as $13 and $3. Defendant offered convincing proof that the actual cost of assembly of the infringing article, and in the manner in which its production thereof was ordinarily handled was $4.88. He was, however, unable to give figures as to the cost of assembling coils or hoops and bars under the older process of attachment. After the order of restraint here-

in had issued defendant, through the ingenuity of necessity, succeeded in doing the required wiring at a cost of $5.62 per ton. The Master, upon this latter testimony, took the position that the last-mentioned figure might not be used as a basis of computation for the reason that it came into existence after injunction. So, too, the Master held that the device which, in the *Electric Welding Co. case, supra,* was held not to infringe plaintiff's patent was not open to defendant.

725 This latter construction, I understand, consists of a channel bar, and there is no cut of any kind in the end or edge of either of the channel sides; attachment being made by using the back body of the central bar of the channel and stamping a tongue out of said solid central back portion, and then winding such tongue over the coil, which does not rest in the body of the bar, but outside of it.

It is defendant's contention that this patent was open to it because of the fact that plaintiff's patent is to be considered as of its date of reissue, to wit, August 15, 1916. Objection is,
726 therefore, made that the Master imposed upon defendant, rather than upon plaintiff, the burden of showing that the Electric Welding device, and any others that might exist, were available to defendant. The Master said:

> "To what extent these" (other structures) "were used, how far they came into competition with the plaintiff's structure, and what

advantage the latter has or what savings or profits over the others is not shown."

Prior, however, to the defendant's failure to introduce such proof, the plaintiff had shown that defendant, upon the manufacture and sale of the infringing structure, had made a profit of more than $15,000. When such proof was made it developed upon defendant, if it wished to limit its liability, "to disprove plaintiff's case, or to offer evidence in mitigation, or both." *Westinghouse Co,* v. *Wagner Mfg. Co.,* 225 U. S. 616. Plaintiff's *prima facie case,* assuming the structure to be unitary in nature, was complete, and the burden of producing evidence to disprove that case shifted to defendant. *Cowen Co.* v. *Houck Mfg. Co.,* 249 Fed. 285. 728

As the proof stands, and as was said by the Master, "the only method open at the time of infringement was the method of wiring it."

Upon an analysis of evidence much more extensive than I have indicated, the Master concluded this case to be within Class b of the classification set up in *Westinghouse* v. *Wagner Mfg. Co., supra,* to wit, "Where a patent, though using old elements, gives the entire value to the combination, the plaintiff is entitled to recover all the profits." 729

The Master, however, in the course of his opinion, remarked that the evidence upon which this conclusion was based was not specifically introduced for the purpose of establishing the point

730 *Opinion, Knox, D. J.*

made; and indeed, that plaintiff made no effort to apportion profits as between the patented and unpatented features of the structure. From this defendant argues that improper consideration was given such evidence as went into the case.

There was, upon the introduction of such evidence, no limitation or qualification as to the purpose for which it should be used; and evidence competent for one purpose may also be competent for another, and, being sufficient, may rule the decision. If this be true, it was not improper to
731 apply such evidence to any issue as to which it had probative force, and the Master found such evidence sufficient to establish that an apportionment was impossible.

As I understand the case of *Waldron* v. *Waldron*, 156 U. S. 361, it had to do with the application of certain evidence which, while competent for a limited purpose, was grossly incompetent as bearing upon another issue involved, and thus, I think, in the present instance, is not authoritative.

Defendant further says that there was no evi-
732 dence that any sale whatever, either by this defendant or by any other person, firm or corporation within the United States, was effected or affected by reason of the patented combination; or that such patented combination was known to any purchaser whatever and considered by him or it as a reason for making the purchase or refraining therefrom.

733

It does appear that defendant sold a large quantity of the infringing structures, that it was much cheaper, more satisfactory than any such built by any other method then employed; from this it may fairly be inferred that the demand therefor primarily rested upon that combination of elements upon which Vandenburgh received his patent.

From what has been said I feel justified in overruling defendant's exceptions I, II, III and IV, and I accordingly do so. Exceptions VI, VII, IX, X, XI, XII, XIII, XIV, XV, XVI, 734
XVII, XVIII relate to specific findings of fact or of law which the Master either failed to find, or which he declined to find in the form suggested. Each of said exceptions is overruled, it being my opinion either that the findings requested are not warranted, or where warranted, have been sufficiently found. If, however, defendant considers it to be of advantage to it upon appeal I will specifically find the fact embodied in Exception No. VIII.

Exception V of defendant's bill remains for consideration. It is

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> The failure to allow the entire interest upon capital invested at an offset to any profits found to have accrued, there being no authority in law for a apportionment of said interest.

I think there is no merit in this exception. If, in a case of this character, profits may be re-

covered and losses disregarded (and as to this there appears to be no doubt), it would seem that interest on such part of defendant's investment as is chargeable to the manufacture and sale of the infringing structures upon which losses occurred, should be looked upon as increasing, rather than as diminishing, defendant's loss. For this reason I overrule defendant's fifth exception.

Thus I come to the exceptions filed by plaintiff.

737 One of these is that the Master erred in making defendant any allowance of interest on its investment.

Complaint is made (1) that the principle is untenable, and (2) that inasmuch as defendant's factory produced bars and spirals as well as angles which were combined, there should be more definite proof as to what part of defendant's capital was devoted to the manufacture of the infringing article.

As to the first branch of this exception it is enough to call attention to the fact that the question of the propriety of such allowance, once the

738 amount of capital devoted to such manufacture is ascertained, is no longer open in this district. *Oehring et al.* v. *Fox Typewriter Co.*, 251 Fed., 584.

As to the alleged insufficiency of the proof upon this subject, I am satisfied that the method pursued in arriving at that portion of the investment devoted to the manufacture of spirals brings about a result as accurate and complete as it is reasonably possible to secure. When a factory

is devoted, as was defendant's, to the manufacture of a number of products it is impossible, save by a system of averages, to arrive at anything approaching accuracy. It is said that here there was no direct proof of the amount of capital devoted to manufacturing spirals, and that such proof is available. With this I do not agree. Suppose that the machines and all the other elements entering into a proper calculation of investment devoted to such manufacture were all definitely set forth,—the original cost thereof could not for long be taken as a basis of computation. The incidents 740
of depreciation, replacements and the like would quickly become factors to be taken into account; and once this had come to pass one would be relegated to the use of estimates, appraisals and opinions which, dependent upon the knowledge, skill and interest of the persons giving them, would be contradictory and widely divergent. In the case at bar defendant kept a detailed and complete account of its costs, charges, expenses, overhead and general investment. It was kept without reference to the present litigation and with the sole purpose of having at hand for its own use, convenience and information, the state of 741
its business. There can be no doubt that the account was honestly kept; and I am of the opinion that there was before the Master evidence from which he could, and did, satisfactorily apportion the interest between the several kinds of business. *Seabury* v. *Am Ende*, 152 U. S. 561. As to plain-

tiff's argument that the case of *Rubber* v. *Goodyear*, 9 Wall, 788, 804, renders impossible the allowance of interest here made, I can do no better than call attention to what was said in *Western Glass Co.* v. *Schmertz Wire Glass Co.* 226 Fed. 738, with reference to the Goodyear decision and others in the Supreme Court bearing upon the present subject.

Plaintiff's first, second and fourth exceptions relate to the Master's failure to find a reasonable royalty for the use of plaintiff's structure.
743 Upon evidence which was satisfactory to the Master, and which, in my judgment, supports his conclusions, he has, upon this feature of the case, found against the plaintiff. His reasons therefor are, to my mind, so sound and convincing as to make unnecessary a further discussion of the subject.

The third exception is, that there should have been a finding that spirals sold by defendant were for the purpose of assisting its other business, and that the losses should not be applied solely to spirals. I think this is not a good ob-
744 jection. If the exception were to be allowed, it would only be proper that, as to the profits, defendant should receive a credit to the extent that such profits were contributed to by defendant's other business.

Exception Seven, dealing with plaintiff's claim that it is entitled to recover interest as to each item of profit as of the date the same was realized, is overruled upon the authority of *Oehring*

v. *Fox Typewriter Co., supra,* and the cases therein cited. By virtue of the same authority, interest will be allowed to plaintiff from the date of the Master's report, and the defendant will likewise be held for the cost of the reference. By what has just been said, plaintiff's exceptions Five and Eight are disposed of.

I think that I have, in substance, covered the exceptions filed by each of the parties to the report of the Master. If perchance, I have not specifically discussed any exceptions it is not by reason of my failure to consider the same, but 746
because of the fact that I concur with the Master therein. A decree in conformity herewith may be submitted.

April 21, 1921.

JOHN C. KNOX,
U. S. District Judge.

748

Final Decree

At a stated term of the United States District Court, held in and for the Southern District of New York, at the Federal Building, New York City, this 28th day of April, 1921.

Present: Hon. John C. Knox.
United States District Judge.
Holding the Court.

749

George E. Vandenburgh,
Plaintiff,
against
Concrete Steel Company,
Defendant.

Equity
14-88.

This cause came on to be heard at this term and was argued by counsel, and thereupon, upon consideration thereof, it was

Ordered, Adjudged and Decreed as follows:

750

1. That each and all exceptions of the plaintiff be, and hereby are, overruled.

2. That each and all exceptions, save Exception No. VIII, of the defendant, be overruled.

3. That defendant's exception No. VIII is sustained.

4. That the Master's report be, and hereby is, in all other respects affirmed.

5. That the plaintiff recover no damages.

6. That the plaintiff recover profits in the sum of $15,918.33 with interest from the date of the Master's report, to wit November 15th, 1920. 752

7. That the defendant be taxed $500 for the Master's fee and $150.85 for his stenographer's fee.

8. That the plaintiff recover from the defendant his costs to be taxed, including the cost of all stenographer's minutes paid by him, both in Court and before the Master, and also his costs in the Circuit Court of Appeals in the sum of $78.48.

Signed, Jno. C. Knox,
U. S. D. J. 753

Approved as to form
Counsel for Plaintiff.

Emery, Booth, Janney & Varney,
Counsel for Defendant.

754

Plaintiff's Petition for Appeal

UNITED STATES DISTRICT COURT

SOUTHERN DISTRICT OF NEW YORK

GEORGE E. VANDENBURGH,
Plaintiff,

vs.

CONCRETE STEEL COMPANY,
Defendant.

755

The above named plaintiff, George E. Vandenburgh, considering himself aggrieved by a final decree made and entered herein on the 28th day of April, 1921, hereby petitions this Court for an order allowing him to prosecute an appeal from said decree to the United States Circuit Court of Appeals for the Second Circuit, for the reasons specified in an assignment of errors filed herewith; and prays that citation issued as provided by law.

756

O. ELLERY EDWARDS,
Solicitor for Plaintiff.

Dated, New York, June 7, 1921.

757

Order Allowing Appeal

At a Special Term of the District Court of the United States for the Southern District of New York held in the Post Office Building in the Borough of Manhattan of the City of New York on the 8th day of June, 1921.

Present: Hon. John C. Knox,
United States District Judge,
Holding the Court. 758

George E. Vandenburgh,
Plaintiff,
vs.
Concrete Steel Company,
Defendant.

George E. Vandenburgh, the above named plaintiff, having presented and filed a petition for an order allowing an appeal to the United States Circuit Court of Appeals for the Second Circuit from a final decree made and entered 759 herein on the 28th day of April, 1921, and having filed his assignment of errors with said petition, now, upon motion of O. Ellery Edwards, Esq., Solicitor for the plaintiff it is hereby

760 *Order Allowing Appeal*

ORDERED that an appeal to the United States Circuit Court of Appeals for the Second Circuit from the final decree made and entered herein on the 28th day of April, 1921, be, and the same hereby is allowed, and it is further,

ORDERED that an appeal bond in favor of the defendant in the usual form and in the sum of two hundred and fifty dollars ($250) be filed by the plaintiff in this court and be approved by the same and that this appeal be effective when such bond be furnished.

761

JOHN C. KNOX,
U. S. D. J.

Dated, New York, June 8, 1921.

763

Assignment of Errors

UNITED STATES DISTRICT COURT

SOUTHERN DISTRICT OF NEW YORK

GEORGE E. VANDENBURGH, Plaintiff, vs. CONCRETE STEEL COMPANY, Defendant.	In Equity No. 14-88.

764

Now comes GEORGE E. VANDENBURGH, plaintiff in the above entitled case, in which a final decree was made and entered on the 28th day of April, 1921 and says that said decree is erroneous and against the just rights of the plaintiff in the following particulars:

FIRST: The District Court erred in overruling the plaintiff's exception No. 1 to the final report of the Master as follows:

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1. The report should find and set a reasonable royalty from the testimony adduced.

SECOND: The District Court erred in overruling the plaintiff's exception No. 2 to the final report of the Master as follows:

766 *Assignment of Errors*

2. The report is erroneous in stating that none of the evidence affords any basis for fixing a reasonable royalty.

THIRD: The District Court erred in overruling the plaintiff's exception No. 3 to the final report of the Master as follows:

3. The report is erroneous in not finding that the spirals sold by defendant were sold to assist its other steel busi-
767 ness and that the losses should not be applied solely to spirals.

FOURTH: The District Court erred in overruling the plaintiff's exception No. 4 to the final report of the Master as follows:

4. That the report is erroneous in not finding that a reasonable royalty is not less than seventy-four (74) cents per ton and should find a royalty not less than the license royalty of three ($3.00) dollars per ton.

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FIFTH: The District Court erred in overruling the plaintiff's exception No. 5 to the final report of the Master as follows:

5. That the report failed to find that the defendant should pay the cost of this reference.

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SIXTH: The District Court erred in overruling the plaintiff's exception No. 6 to the final report of the Master as follows:

> 6. That the amended report errs in that it allows the sum of Three thousand sixty-three dollars and eighty cents ($3063.80) interest on the investment to be credited to the defendant when no such interest should be allowed to the defendant and no such interest should be credited.

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SEVENTH: The District Court erred in overruling the plaintiff's exception No. 7 to the final report of the Master as follows:

> 7. That the amended report is erroneous in not finding that the plaintiff is entitled to recover interest at six per cent as to each item of profit in the statement of account filed by the defendant and in evidence as plaintiff's Exhibit 3, because each such item is admitted by the defendant, is liquidated as to amount and definite as to date, and so as to each such item of profit interest should be allowed from the said date admitted by the defendant on the said amount until payment is made.

771

EIGHTH: The District Court erred in overruling the plaintiff's exception No. 8 to the final report of the Master as follows:

8. That the amended report is erroneous in not finding that the plaintiff is entitled to recover interest at six per cent on the total amount of profit made by the defendant and admitted in Exhibit 3 from the date of filing said statement of account by the defendant due was then and there admitted by the defendant as a liquidated amount as of such date.

773 NINTH: The District Court erred in overruling the plaintiff's exception No. 9 to the final report of the Master as follows:

9. That the amended report is erroneous because the Master accepted the defendant's method of calculating interest on the investment, whereas this method was wrong for the following reasons, to wit:

1st. No showing was made by the defendant as to what capital was invested in producing non-infringing devices and what
774 capital was invested in producing infringing devices.

2nd. There was no evidence to show that the infringing devices were produced by the same machinery, apparatus or other device that produced the non-infringing devices.

3rd. That no witness was called to show what non-infringing devices were made by the defendant during the time covered by the accounting and what machinery was used in producing such devices and whether or not it was the same machinery that was used in producing the infringing devices, so that it is impossible to determine from the record what part of the plant and equipment produced infringing devices and what part produced non-infringing devices, or to draw any accurate conclusion of any kind whatsoever as to this matter. 776

4th. There was nothing to show how the capital and surplus was used in the business of the defendant and what part of it was used in producing infringing devices and what part of it was used in producing non-infringing devices.

5th. That the method of averaging the aggregate capital and surplus employed in the business of the defendant during the period of the accounting is an erroneous method because it is not shown that capital and surplus were actually employed in the business. 777

6th. That as in the present case the defendant's plant and real estate were used for several other and wholly different

778 *Assignment of Errors*

kinds of manufacture than the patented article and the evidence offered to distinguish between the profits derived from the use of the plant and real estate for making the patented article and those attributable to the other sources of profit was not sufficient to enable the Master to make a satisfactory apportionment or allowance for interest on the investment.

779 7th. That as there were infringing and non-infringing operations conducted by the defendant and as there has been no evidence to show the extent to which it was actually employed in the infringing operations, there is no basis for the allowance of interest which may be deducted from the profits due to the infringing operations of the defendant.

780 8th. That the ratio between the total sales of the defendant to the infringing sales is not shown to be the ratio of the average capital employed in the total business to the capital employed in the infringing operations, and therefore the ratio as to interest is erroneous for this reason.

GEORGE E. VANDENBURGH,
By O. ELLERY EDWARDS,
Solicitor for Plaintiff.

261

781

Citation

UNITED STATES CIRCUIT COURT OF APPEALS

FOR THE SECOND CIRCUIT

GEORGE E. VANDENBURGH,
Plaintiff,
vs.
CONCRETE STEEL COMPANY,
Defendant. 782

BY THE HONORABLE JOHN C. KNOX,
One of the Judges of the DISTRICT COURT OF THE UNITED STATES for the SOUTHERN DISTRICT OF NEW YORK, in the SECOND CIRCUIT.

To CONCRETE STEEL COMPANY

GREETING:

YOU ARE HEREBY CITED and admonished to be and appear before a UNITED STATES CIRCUIT 783
COURT OF APPEALS for the Second Circuit, to be holden at the Borough of Manhattan in the City of New York, in the District and Circuit above named, on the day of July, 1921, pursuant to an appeal filed in the Clerk's Office of the

District Court of the United States for the Southern District of New York, wherein George E. Vandenburgh is the appellant and you are the appellee, to show cause, if any there be, why the decree in said appeal mentioned should not be corrected and speedy justice should not be done in that behalf.

GIVEN UNDER MY HAND at the Borough of Manhattan, in the City of New York, in the District and Circuit above named, this 8th
785 day of June, in the year of our Lord One Thousand Nine Hundred and Twenty-one, and of the Independence of the United States the One Hundred and Forty-fifth.

JNO C. KNOX,
Judge of the District Court of the United States for the Southern District of New York.

787

Defendant's Petition for Appeal

UNITED STATES DISTRICT COURT

SOUTHERN DISTRICT OF NEW YORK

GEORGE E. VANDENBURGH,
Plaintiff,
vs.
CONCRETE STEEL COMPANY,
Defendant.

Equity
No. 14-88.

788

The above named defendant, Concrete Steel Company, considering itself aggrieved by a final decree made and entered herein on the 28th day of April, 1921, hereby petitions this Court for an order allowing it to prosecute an appeal from said decree to the United States Circuit Court of Appeals for the Second Circuit, for the reasons specified in an assignment of errors filed herewith; and prays that citation issue as provided by law.

And your petitioner further prays that an order be made fixing the amount of security which 789
the defendant shall give upon such appeal, and that upon giving such security, the execution of the judgments entered herein in conformity with said decree be suspended and stayed until the determination of said appeal.

LUCIUS E. VARNEY,
Solicitor for Defendant.

Dated, June 3, 1921.

790

Order Allowing Appeal

At a Special Term of the District Court of the United States for the Southern District of New York held in the Post Office Building in the Borough of Manhattan of the City of New York the day of May, 1921.

Present:
Hon. John C. Knox,
United States District Judge.

791

George E. Vandenburgh,
Plaintiff,

vs.

Concrete Steel Company,
Defendant.

Concrete Steel Company, the above named defendant, having presented and filed a petition for an order allowing an appeal to the United States Circuit Court of Appeals for the Second
792 Circuit from a final decree made and entered herein in the 28th day of April, 1921, and having filed its assignment of errors with said petition, now, upon motion of Lucius E. Varney, Esq., solicitor for the defendant it is hereby

Order Allowing Appeal 793

ORDERED that an appeal to the United States Circuit Court of Appeals for the Second Circuit from the final decree made and entered herein on the 28th day of April, 1921, be, and the same hereby is allowed, and it is further

ORDERED that the amount of security required be and the same hereby is fixed in the sum of seventeen thousand four hundred thirty-five dollars and sixty-three ($17,435.63), covering the judgment of sixteen thousand five hundred thirty-four dollars and seventy-eight cents ($16,- 794
534.78) entered in favor of the plaintiff, the judgment of six hundred fifty dollars and eighty-five cents ($650.85) entered in favor of William Parkin, Master, and two hundred fifty dollars ($250.00) as security for costs on appeal; and that the plaintiff gave a bond conditioned as required by law in the sum of seventeen thousand four hundred thirty-five dollars and sixty-three cents ($17,435.63) and that upon giving such a bond the execution of the judgments entered herein be suspended and stayed until the determination of said appeal.

795

(Signed) JNO. C. KNOX,
U. S. D. J.

Dated, June 3, 1921.

796

Assignment of Errors

UNITED STATES DISTRICT COURT

SOUTHERN DISTRICT OF NEW YORK

GEORGE E. VANDENBURGH,
Plaintiff,
vs.
CONCRETE STEEL COMPANY,
Defendant.

In Equity
No. 14-88.

797

Now comes Concrete Steel Company, defendant in the above entitled cause, in which a final decree was made and entered on the 28th day of April, 1921, and says that said decree is erroneous and against the just rights of the defendant in the following particulars:

FIRST: The District Court erred in overruling the defendant's exception No. 1 to the final report of the Master as follows:

798

1. To any award of profits in view of the Master's holding, page 4, that

"It was the duty of the plaintiff to apportion the profits between those due to the patented feature and those attributable to the unpatented part, or to show that such apportionment is impossible by reason of the defendant's acts.

> The plaintiff has made no effort to work out an apportionment or to show that one was difficult or impossible."

and

> "These estimates (of plaintiff) give no basis for an apportionment for the reason that it does not appear what if any part of this saving went to the defendant."

And in view of his further finding, page 5, that 800

> "The spirals and bars are shipped separate and assembled on the job;—field assembly it is called. Who pays the cost of this, whether the manufacturer or contractor, is not stated. * * * There is nothing to show that the defendant made any profit from saving in labor."

and

> "The plaintiff has wholly failed to sustain the burden of making such an apportionment." 801

SECOND: The District Court erred in overruling the defendant's exception No. II to the final report of the Master as follows:

> "II. To the Master's finding that (page 6)
>
> 'The evidence shows that the whole value of the defendant's structure as a

802 commercial article lay in the patented feature and that all the profits from the sale of the article were due to it.'

there being no evidence that any sale whatever, either by this defendant or by any other person, firm or corporation within the United States was effected or affected by reason of the patented combination; or that such patented combination was known to any purchaser whatever and considered by him or it
803 as a reason for making the purchase or refraining therefrom.''

THIRD: The District Court erred in overruling the defendant's exception No. III to the final report of the Master as follows:

''III. To the Master's finding that

'The difference in cost between the old method of wiring and the Vandenburgh method would be prohibitive.'

804 as without evidence to sustain it because the same is restricted to a single method of attachment and based upon evidence of so-called experts founded upon estimates and without evidence of any actual costs incurred commercially; and in view of the Master's statement, page 13, that

'There were other devices such as that involved in the Electric Welding case and

805

a method of attachment by staples clinched to the longitudinal bar, the cost of which Professor Thayer says would be about the same as the Vandenburgh method. To what extent these were used, how far they came into competition with the plaintiff's structure and what advantage the latter has or what saving or profit, over the others is not shown;'

the burden of proof as to these matters being upon the plaintiff and failure to show 806
them being a bar to any recovery whatever."

FOURTH: The District Court erred in overruling the defendant's exception No. IV to the final report of the Master as follows:

"IV. To the Master's holding, page 6, in effect that

'Only unpatented methods of attachment could be used as standards of comparison'

807

in view of the references cited in the answer and proved in the trial of the case."

FIFTH: The District Court erred in overruling the defendant's exception No. V to the final report of the Master as follows:

"V. To the Master's failure to allow the entire interest upon capital invested as an

808 offset to any profits found to have accrued, there being no authority in law for an apportionment of said interest."

SIXTH: The District Court erred in overruling the defendant's exception No. VI to the final report of the Master as follows:

"VI. To the Master's failure specifically to find the conclusion of fact, set out in prayer No. I of the defendant submitted
809 to him before the filing of his report, as follows:

'The Master finds as a fact that plaintiff has not shown by any evidence in this case that it has suffered any damage from infringement of the letters-patent in suit by the defendant in this case.' "

SEVENTH: The District Court erred in overruling the defendant's exception No. VII to the final report of the Master as follows:

810 "VII. To the Master's failure specifically to find the conclusion of fact, set out in prayer No. II of the defendant submitted to him before the filing of his report, as follows:

'The Master finds as a fact that the plaintiff is not engaged in the manufacture and sale of the concrete reinforcing such as is described in the letters-patent in suit

and has suffered no damages by reason of any competition of the defendant in business of the character indicated.' ''

EIGHTH: The District Court erred in not sustaining the defendant's exception to the final report of the Master, No. IX, as follows:

''IX. To the Master's failure specifically to find the conclusion of fact, set out in prayer No. IV of the defendant submitted 812
to him before the filing of his report, as follows:

'The Master finds and so reports the fact to be that the plaintiff has not shown by any competent and material evidence in this case what would be a reasonable royalty for the use of the invention described in the letters patent in suit; and that the evidence on behalf of the plaintiff is in such conflict that he is unable to determine therefrom what would be a reasonable royalty for the use of the inven- 813
tion; and that the weight of evidence, giving due regard to the qualifications and experience of the witnesses, both on behalf of the plaintiff and on behalf of the defenadnt, leaves wholly undetermined the fact that any royalty whatever would have been agreed upon and paid either by this defendant or by any other person in the trade for the use of the said

invention described in the letters patent in suit.' "

NINTH: The District Court erred in not sustaining the defendant's exception to the final report of the Master, No. X, as follows:

"X. To the Master's failure, specifically to find the conclusion of fact, set out in prayer No. V of the defendant submitted to him before the filing of his report, as fol-
815 lows:

'The Master finds and so reports the fact to be that there were other methods in use at the time of the issue of the reissued letters patent in this case which were satisfactory to the trade and accomplished the purposes of the Vandenburgh construction described in the letters patent in suit in an efficient and workmanlike manner, and that there is no advantage provided in the Vandenburgh construction over the constructions referred
816 to; and he further finds as a fact that no reason is shown by the evidence in this case why any person or persons, including the defendant in this case, should pay any royalty whatever for the use of the Vandenburgh construction.' "

TENTH: The District Court erred in not sustaining the defendant's exception No. XI to the final report of the Master, as follows:

"XI. To the Master's failure specifically to find the conclusion of law, set out in prayer No. VI of the defendant submitted to him before the filing of his report, as follows:

"The Master finds, as a conclusion of law from all the competent and material evidence in the case on the question of damages, that plaintiff is entitled to nominal damages of six cents, and no more; under the rules of law laid down by the Supreme Court of the United States in the following cases: 818

Garretson v. Clark, 111 U. S. 121;

and by the Circuit Court of Appeals for the Second Circuit in

Tuttle v. *Gaylord*, 28 F. R. 97;

Hohorst Case, 91 F. R. 655.' "

ELEVENTH: The District Court erred in not sustaining the defendant's exception No. XII to the final report of the Master, as follows:

"XII. To the Master's failure, specifically to find the conclusion of fact, set out in prayer No. VII of the defendant submitted 819 to him before the filing of his report, as follows:

'The Master finds as a fact that there were concrete reinforcements in use in the trade other than in the form shown by the plaintiff which were capable of efficient use and which were in fact so used

820 satisfactorily; and that there is no competent and material evidence in the case showing any financial advantage to the defendant from the use of the infringing concrete reinforcements over such other concrete reinforcement. Specifically the Master finds and so reports the fact to be that the forms of concrete reinforcements designated briefly as the Third Circuit forms, which were referred to by the Court of Appeals for the Third Circuit in the

821 case of

Vandenburgh v. Electric Welding Co., 263 F. R. 95;

and particularly described by the Court of Appeals on Page 97 beginning at line 20, and ending at line 43 were practical and reliable forms of concrete reinforcement and are held by the Court not to infringe the letters patent in suit, and that there is no competent and material evidence in

822 the case of any advantage whatever of the plaintiff's patented structure over the form of concrete reinforcing described by the Court as above noted, which said form of concrete reinforcement was open to the defendant in this case to make, use and sell.

Other forms of concrete reinforcement, particularly the types known as wired reinforcements, were stated by the plain-

tiff's witnesses to be outside of the patent in suit and the Master finds the fact so to be and he further finds that there is no competent and material evidence in the case of any financial advantage from the use of the construction shown in the patent in suit over such other forms of concrete reinforcement.' "

TWELFTH: The District Court erred in not sustaining the defendant's exception No. XIII to the final report of the Master as follows: 824

"XIII. To the Master's failure specifically to find the conclusion of fact, set out in prayer No. VIII of the defendant submitted to him before the filing of his report, as follows:

'The Master finds and so reports the fact to be that there is no competent and material evidence in the case that the sale of the concrete reinforcements by the defendant was effected or affected by reason of the so-called Vandenburgh combination 825 disclosed in the patent in suit.

Specifically the Master finds and so reports the fact that the sales were merely an incidental and relatively insignificant part of the total sales of the defendant, and that such sales were made in general in connection with sales of other and more important items and as an accommodation to purchasers of larger and more impor-

826 tant items who desired to fill all their wants from a single source.' "

THIRTEENTH: The District Court erred in not sustaining the defendant's exception No. XIV to the final report of the Master, as follows:

"XIV. To the Master's failure specifically to find the conclusion of fact, set out in prayer No. IX of the defendant submitted to him before the filing of his report, as fol-
827 lows:

'The Master finds and so reports the fact to be that the plaintiff has given no evidence showing any apportionment of total profit of the defendant in the sale of the iron work referred to in their report entitled 'Plaintiff's Accounting Exhibit 4' between the ordinary manufacturer's profit from the sale of iron work, and those due to the use of the invention of the patent in suit.' "

828 FOURTEENTH: The District Court erred in not sustaining the defendant's exception No. XV to the final report of the Master, as follows:

"XV. To the Master's failure specifically to find the conclusion of fact, set out in prayer No. X of the defendant submitted to him before the filing of his report, as follows:

829

'The Master finds as a fact that the plaintiff has given no evidence showing that an apportionment of profits in the way indicated in Prayer IX is impossible either by reason of expense or difficulty, and as a conclusion of law thereon he reports that the defendant was under no duty to attempt to apportion profits.''

FIFTEENTH: The District Court erred in not sustaining the defendant's exception No. XVI to the final report of the Master, as follows:

830

"XVI. To the Master's failure specifically to find the conclusion of fact, set out in prayer No. XI of the defendant submitted to him before the filing of his report, as follows:

'The Master finds on all the competent and material evidence in the case that no basis for apportioning profits between sales of iron work in general and profits due to the use of the invention of the patent in suit has been laid.'"

831

SIXTEENTH: The District Court erred in not sustaining the defendant's exception No. XVII to the final report of the Master, as follows:

"XVII. To the Master's failure specifically to find the conclusion of law, set out

in prayer No. XII of the defendant, submitted to him before the filing of his report, as follows:

'The Master finds, as conclusion of law from the evidence, that plaintiff is not entitled to any sum by way of recovery of profits from the defendant in this case earned by it from the practice of the invention set out in the claims in suit; under the rules of law laid down by the Supreme
883 court of the United States in

Dobson v. *Hartford Carpet Co.*, 114 U. S. 439;
Dobson v. Dornan, 118 U. S. 10;
Mowry v. *Whitney*, 81 U. S. 620;
Black v. *Thorne*, 111 U. S. 121;
Garretson v. *Clark*, 111 U. S. 122;
Coupe v. *Royer*, 155 U. S. 565;
Rude v. *Westcott*, 130 U. S. 152;
Spaulding v. *Mason*, 161 U. S. 375;

834 And in the Courts of this Circuit in
Tuttle v. *Gaylord*, 28 F. R. 97;
Hohorst Case, 91 F. R. 655;
Roemer v. *Simon* 31, F. R. 41.'"

SEVENTEENTH: The District Court erred in not sustaining the defendant's exception No. XVIII to the final report of the Master, as follows:

"XVIII. To the Master's failure specifically to find the conclusion of fact and law, set out in prayer No. XIII of the defendant submitted to him before the filing of his report as follows:

'The Master finds as conclusion of fact and law from all the competent and material evidence in the record of the whole case; that plaintiff is entitled to a decree of six cents damages, no profits, and its costs up to and including the interlocutory 836
decree; and that defendants are entitled to the costs of the accounting; under the rule of law laid down by the Supreme Court of the United States.'"

EIGHTEENTH: The District Court erred in ordering that the plaintiff recover profits in the sum of $15,918.33 with interest from the date of the Master's report, to wit, November 15, 1920.

NINETEENTH: The District Court erred in ordering that the defendant be taxed $500.00 for the Master's fee and $150.85 for his stenogra- 837
pher's fee.

TWENTIETH: The District Court erred in ordering that the plaintiff recover from the defendant its costs to be taxed including the costs of all stenographer's minutes paid by him, both in court and before the Master and also his costs in

838 *Assignment of Errors.*

the Circuit Court of Appeals in the sum of $78.48.

CONCRETE STEEL COMPANY,
By LUCIUS E. VARNEY,
Solicitor and of Counsel.

EMERY, VARNEY, BLAIR & HOGUET,
T. J. JOHNSTON,
L. E. VARNEY,
Of Counsel.

839

841

Citation

By the Honorable JOHN C. KNOX, one of the Judges of the District Court of the United States for the Southern District of New York, in the Second Circuit.

To GEORGE E. VANDENBURGH,

GREETING

YOU ARE HEREBY CITED and admonished to be and appear before a United States Circuit Court 842
of Appeals for the Second Circuit, to be holden at the Borough of Manhattan in the City of New York, in the District and Circuit above named, on the 5th day of July, 1921, pursuant to an appeal filed in the Clerk's Office of the District Court of the United States for the Southern District of New York, wherein Concrete Steel Company is the appellant and you are the appellee to show cause, if any there be, why the decree in said appeal mentioned should not be corrected and speedy justice should not be done in that behalf.

843

Given under my hand at the Borough of Manhattan, in the City of New York, in the District and Circuit above named, this 3rd day of June, in the year of our Lord One Thousand Nine Hundred and Twenty-

one, and of the Independence of the United states the One Hundred and Forty-fifth.

JNO. C. KNOX,
Judge of the District Court of the United States for the Southern District of New York, in the Second Circuit.

847

Stipulation Re Contents of Record

UNITED STATES DISTRICT COURT

SOUTHERN DISTRICT OF NEW YORK.

GEORGE E. VANDENBURGH,
Plaintiff,
vs.
CONCRETE STEEL COMPANY,
Defendant.
} In Equity

848

IT IS STIPULATED AND AGREED by and between counsel:

I. That the parties shall print a joint record, one-half of the cost of printing to be advanced by the defendant and one-half by the complainant, to be taxed as the Court may direct.

II. That the record on the former appeal to the Circuit Court of Appeals, the Court consenting thereto, shall be used as a physical exhibit, and either party may refer thereto with 849 the same force and effect as if printed as part of this record.

III. That the Clerk shall include the following matters in the Transcript of Record in this case, for the Circuit Court of Appeals:

850 *Stipulation Re Contents of Record.*

(a) The order of the District Court entered upon the mandate of the Circuit Court of Appeals, referring the cause to a Master.

(b) The Master's *praecipe*.

(c) The proceedings before the Master, including the testimony and paper exhibits.

(d) The requests for findings by the plaintiff, if any.

851

(e) The requests for findings by the defendant.

(f) The Master's final report.

(g) The exceptions by the plaintiff to the Master's final report.

(h) The exceptions by the defendant to the Master's final report.

852 (i) The opinion of his Honor Judge Knox in the District Court, passing upon the Master's report.

(j) The order entered upon the decision of the District Court.

(k) The appeal papers, including

(1) The petition for appeal of the plaintiff.

(2) The order allowing the appeal of the plaintiff.

(3) The assignment of errors of the plaintiff.

(4) The citation of the plaintiff.

(5) The petition for appeal of the defendant.

(6) The order allowing the appeal of the defendant.

(7) The assignment of errors by the defendant. 854

(8) The citation of the defendant.

(9) This stipulation.

(10) The stipulation of completeness of the Transcript.

(11) The Clerk's Certificate.

IV. It is further stipulated that the bonds need not be printed in the record.

855

O. ELLERY EDWARDS,
Solicitor for Plaintiff.

EMERY, VARNEY, BLAIR & HOGUET,
Solicitors for Defendant.

So ordered:

H. G. WARD,
United States Circuit Judge.

New York, June 21, 1921.

856

Stipulation

UNITED STATES DISTRICT COURT,

SOUTHERN DISTRICT OF NEW YORK.

GEORGE E. VANDENBNRGH,
Plaintiff-Appellant,
vs.
CONCRETE STEEL COMPANY,
Defendant-Appellee,

857

It is hereby stipulated and agreed, that the foregoing is a true transcript of the record of the said District Court in the above-entitled matter as agreed on by the parties.

Dated, August 7th, 1921.

O. ELLERY EDWARDS,
Attorney for Plaintiff.

EMERY, VARNEY, BLAIR & HOGUET,
Attorneys for Defendant.

858

Clerk's Certificate

859

United States of America,
Southern District of New York, } ss:

GEORGE E. VANDENBURGH,
Plaintiff-Appellant,
vs.
CONCRETE STEEL COMPANY,
Defendant-Appellee,

I, ALEXANDER GILCHRIST, JR., Clerk of the District Court of the United States of America for the Southern District of New York, do hereby Certify that the foregoing is a correct transcript of the record of the said District Court in the above-entitled matter as agreed on by the parties. 860

In testimony whereof, I have caused the seal of the said Court to be hereunto affixed, at the City of New York, in the Southern District of New York, this 7th day of August, in the year of our Lord one thousand nine hundred and twenty-one and of the Independence of the said United States the one hundred and forty-sixth. 861

ALEX. GILCHRIST, JR.,
Clerk.

(Seal)

UNITED STATES OF AMERICA,
Southern District of New York, ss:

I, William Parkin, Clerk of the United States Circuit Court of Appeals for the Second Circuit, do hereby Certify that the foregoing pages, numbered from 1 to 287 inclusive, contain a true and complete transcript of the record on appeal to said Court, in the case of George E. Vandenburg against Concrete Steel Company as the same remain of record and on file in my office.

In testimony whereof, I have caused the seal of the said Court to be hereunto affixed, at the City of New York, in the Southern District of New York, in the Second Circuit, this 31st day of December in the year of our Lord One Thousand Nine Hundred and twenty-one and of the Independence of the said United States the One Hundred and forty-sixth.

[Seal of the United States Circuit Court of Appeals, Second Circuit.]

WM. PARKIN,
Clerk.

UNITED STATES OF AMERICA, *ss:*

[Seal of the Supreme Court of the United States.]

The President of the United States of America to the Honorable the Judges of the United States Circuit Court of Appeals for the Second Circuit, Greeting:

Being informed that there is now pending before you a suit in which George E. Vandenburgh is appellant, and Concrete Steel Company is appellee, No. 172, October Term, 1918, which suit was removed into the said Circuit Court of Appeals by virtue of an appeal from the District Court of the United States for the Southern District of New York, and we, being willing for certain reasons that the said cause and the record and proceedings therein should be certified by the said Circuit Court of Appeals and removed into the Supreme Court of the United States, Do hereby command you that you send without delay to the said Supreme Court, as aforesaid, the record and proceedings in said cause, so that the said Supreme Court may act thereon as of right and according to law ought to be done.

Witness the Honorable William H. Taft, Chief Justice of the United States, the second day of February, in the year of our Lord one thousand nine hundred and twenty-two.

WM. R. STANSBURY,
Clerk of the Supreme Court of the United States.

[Endorsed:] File No. 28629. Supreme Court of the United States, October Term, 1921. No. 674. Concrete Steel Company vs. George E. Vandenburgh. Writ of Certiorari. United States Circuit Court of Appeals, Second Circuit. Filed Feb. 3, 1922. William Parkin, Clerk.

Certiorari from the Supreme Court of the United States to the Circuit Court of Appeals for the Second Circuit.

October Term, 1921.

No. 674.

CONCRETE STEEL COMPANY, Petitioner,

v.

GEORGE E. VANDENBURGH, Respondent.

Stipulation.

In the matter of the return to the writ of certiorari in the above entitled case, it is

Stipulated and agreed by and between counsel for the respective parties that the certified transcript of record heretofore filed with the Court upon the application for the writ shall be taken to be the return of the Circuit Court of Appeals thereto and that no other return need be filed; the Court consenting thereto.

THOMAS J. JOHNSTON,
Counsel for Petitioner.

O. ELLERY EDWARDS,
Counsel for Respondent.

February 3, 1922.

[Endorsed:] Certiorari from the Supreme Court of the U. S. to the Circuit Court of Appeals for the Second Circuit. Concrete Steel Company, Petitioner, v. George E. Vandenburgh, Respondent. No. 674. October Term, 1921. Stipulation. Emery, Varney, Blair & Hoguet, 149 Broadway, New York.

To the Honorable the Supreme Court of the United States, Greeting:

The record and all proceedings whereof mention is within made having lately been certified and filed in the office of the clerk of the Supreme Court of the United States, a copy of the stipulation of counsel is hereto annexed and certified as a return to the writ of certiorari issued herein.

Dated, New York, February 3, 1922.

[Seal of the United States Circuit Court of Appeals, Second Circuit.]

WM. PARKIN,
Clerk of the United States Circuit Court of Appeals for the Second Circuit.

[Endorsed:] United States Circuit Court of Appeals, Second Circuit. George E. Vandenburgh v. Concrete Steel Co. Return to Certiorari. 1.70. Sup. Ct. No. 674.

[Endorsed:] File No. 28629. Supreme Court U. S., October Term, 1921. Term No. 674. Concrete Steel Co., Petitioner, vs. George E. Vandenburgh. Writ of certiorari and return. Filed Feb. 11, 1922.

In the Supreme Court of the United States, October Term, 1921.

No. 674.

CONCRETE STEEL COMPANY, Petitioner,

v.

GEORGE E. VANDENBURGH, Respondent.

On Certiorari to the Circuit Court of Appeals for the Second Circuit.

Stipulation.

The Court consenting thereto, it is stipulated and agreed by and between counsel that as the figures have been correctly summarized in the Master's Report, the columns of figures marked "Plaintiff's Exhibits 2, 3 and 4" and found in the Transcript of Record upon the second appeal to the Circuit Court of Appeals in this case, beginning on page 149 and ending at page 200, may be omitted from the printed record to be used in this Court upon the argument of the return to the writ of certiorari; and the Clerk is directed to omit the same.

THOMAS J. JOHNSTON,
Counsel for Concrete Steel Company, Petitioner.
O. ELLERY EDWARDS,

Dated March 14, 1922, New York City, N. Y.

Counsel for George E. Vandenburgh, Respondent.

[Endorsed:] 674—28629. In the Supreme Court of the United States. Concrete Steel Company, Petitioner, v. George E. Vandenburgh, Respondent. No. 674. Stipulation. Emery, Varney, Blair & Hoguet, 149 Broadway, New York.

[Endorsed:] File No. 28,629. Supreme Court U. S., October Term, 1921. Term No. 674. Concrete Steel Co., Petitioner, vs. Geo. E. Vandenburgh. Stipulation to omit parts of record in printing. Filed Mar. 15, 1922.

IN THE

SUPREME COURT OF THE UNITED STATES.

October Term, 1921.

CONCRETE STEEL COMPANY, Petitioner, v. GEORGE E. VANDENBURGH,	No. 674.

Stipulation.

The Court consenting thereto, it is Stipulated and Agreed that a certified copy of the final or second opinion of the Circuit Court of Appeals in this case, prepared by his Honor Judge Mayer, shall be filed in the office of the Clerk and printed copies thereof attached to the Transcript of Record in this case with the same force and effect as if the opinion had formed part of the original Transcript.

THOMAS J. JOHNSTON,
Counsel for Concrete Steel Company,
Petitioner.

O. ELLERY EDWARDS,
Counsel for George E. Vandenburgh.

Dated, New York, N. Y.,
September 25, 1922.

Opinion.

UNITED STATES CIRCUIT COURT OF APPEALS,

FOR THE SECOND CIRCUIT.

No. 120—October Term, 1921.

Argued November 17, 1921.
Decided December 14, 1921.

GEORGE E. VANDENBURGH,
Plaintiff-Appellant,

v.

CONCRETE STEEL COMPANY,
Defendant-Appellee.

Before: ROGERS, MANTON and MAYER,
Circuit Judges.

Appeals from the District Court of the United States for the Southern District of New York.

Carlos P. Griffin and *O. Ellery Edwards*, for Plaintiff.

Lucius E. Varney, Thomas J. Johnston and *Manvel Whittemore*, for Defendant.

Opinion.

Appeal from final decree of the District Court of the Southern District of New York in favor of plaintiff. Both parties appeal.

MAYER, *Circuit Judge*:

This is the ordinary patent infringement suit which now comes here on appeal from a final decree adjudging that plaintiff recover from defendant profits in the sum of $15,918.33 with interest from the date of the Master's report.

Originally, the District Court dismissed the bill for non-infringement but the decree was reversed for the reasons stated in 258 F. R. 143.

Thereafter, in due course, the usual interlocutory decree was entered, *inter alia*, referring the accounting to a Special Master. The Special Master reported that plaintiff was entitled to recover profits but not damages. The District Court sustained this report. Both the District Judge and the Master wrote opinions fully and carefully discussing the questions involved.

1. The patent has been considered by several courts, *Vandenburgh* v. *Electric Welding Company*, 259 F. R. 579, 263 F. R. 95; certiorari denied 253 U. S. 497; *Vandenburgh* v. *Truscon Steel Company* opinion of District Court for the Northern District of Ohio, Eastern Division dated September 23, 1920; and there have been differences of opinion.

The law of this case, however, is that set forth in this court's opinion per Judge Ward in 258 F. R. *supra*. The gist of the case may be recalled by the following quotation.

"These claims * * * (3 and 5 of the reissue) * * * should be construed consistently with the specifications, which are also literally the same in each patent, as meaning that the spiral coil is rigidly connected with the longitudinal bar at each point of contact. So construed the claim describes a continuous spiral rigidly and integrally connected with kerfs and spurs in the bar constituting a trusslike structure within the body of the concrete resisting lateral and longitudinal strains and which can be more cheaply manufactured than if the spiral were riveted or welded to the bar at each point of contact.

The defendant's witness Cummings frankly admits that this form of reinforcing structure was new in cement work and has come into general use. * * * The defendant's structure when set up to receive the concrete is exactly the same as plaintiff's except that the spiral coil is not rigidly fixed by kerfs and spurs on the bar. This enables the structure to be collapsed when not in use, a commercial improvement for purposes of shipment but which does not justify the defendant's appropriation of the plaintiff's structure."

Defendant's collapsible feature thus did not avoid infringement but merely added a commercial improvement for purposes of shipment.

It is contended by defendant that the case is one for apportionment of profits and that Court and Master erred when they ascribed (as did plaintiff) the whole value of defendant's struc-

ture as a commercial article to the Vandenburgh patent feature.

The theory of defendant is that all or, in any event, part of the commercial value of defendant's structure was due to its collapsible feature and, but for this, the structure would not have have been saleable. Therefore, defendant contends that when plaintiff has not adduced any testimony that the structure is salable when not collapsible or of the profits due to collapsibility, plaintiff has failed to carry the burden of proof cast upon him. *Westinghouse* v. *Wagner Mfg. Co.*, 225 U. S. 604.

Defendant did not introduce any testimony in respect of apportionment. It relied on its contention that because plaintiff failed to produce testimony upon which an apportionment could be based, he would be entitled to nominal damages only.

It may be assumed from the testimony of plaintiff's witnesses that if the structure were shipped there would be a saving in freight. It may, also, be assumed that in some instances, owing to competitive conditions, the determining factor in a sale might be this saving. Yet, it is entirely plain that there never would have been any sale whatever without this Vandenburgh feature. It was the Vandenburgh "form of reinforcing structure" infringed by defendant, which was new in the art. The advantage according to the expert Thayer, over the method, in the prior art, of riveting or wiring is that "the method of wiring uses up a good deal of the section of the bar. It was wasted that way and riveting is also expensive."

Thayer also mentioned the collapsible feature as a part of what he called the "Vandenburgh method" but, with this, we do not agree, in view of our former decision.

It is entirely clear, however, that defendant would never have sold a dollar's worth of its devices had it not availed of plaintiff's patent. The cheapness of manufacture was due to plaintiff's disclosure, which, therefore, created defendant's device as a commercial commodity. Because, then, in some instances, the additional feature of collapsibility saved freight, it cannot be said that this feature placed the burden of showing apportionment on plaintiff.

The test is whether the invention of the patent gives the whole value to the infringing device. Obviously, it must, in a case where the sale of the article would be impossible without availing of the disclosure of the patent and, where the additional feature had no relation to the structure, *qua* structure, or to its shipment as such but only to reduce expense in transportation, accomplished by means which in no manner changed the character of the structure when used for the purposes for which it was designed.

If, therefore, the saving of freight was an accounting element, the burden of so showing was on defendant.

Westinghouse v. *Wagner Mfg. Co.*, *supra.*

This is pecularily illustrated in this case.

Barbour, who is in charge of the details of the sales in defendant's New York office was called by plaintiff. He testified as follows:

> "Q41. In any event, these spirals are shipped collapsed, connected to some longitudinal bars, you understand that to be the subject matter of this suit? A. I understand that to be the subject matter of this suit, but the spirals are not all shipped in that way, not in my territory.
>
> Q42. What percentage are shipped in any other way? A. You mean the territory I know about, that is within New York City or a radius of 25 miles of New York City?
>
> Q43. Where you are selling? A. In New York City or a radius of 25 miles from New York, they ship what we call field assembled; that is, the coil wire is shipped, it is coiled to diameter and shipped separate as a coil, then the angles are punched and shipped separate, that is on account of a restriction.
>
> Q44. Assembled by you or assembled by the contractor? A. By the contractor on the job, what we call field assembly; that is an account of a restriction, I think it is, Metal Lathers Union; they won't allow us—they won't allow I don't know as I should say 'us', but they won't allow the contractors to use spiral in any other way in New York City or within a radius of 25 miles of New York."

The foregoing shows that a considerable business was done by defendant without the collap-

sible feature because of the "Union" restriction and, thus, destroys any contention that collapsibility was, in all instances, an indispensible requisite.

From what has been said *supra,* there was no obligation upon plaintiff to apportion the profits between the Vandenburgh features and the prior art. There was no standard of comparison and, on the evidence in this case, there was no occasion for that reason to apportion profits. See *Philadelphia Rubber Works Co.* v. *U. S. Rubber Reclaiming Works,* F. R. , recently decided by this court.

2. On the facts in the case as clearly set forth by the master and approved by Judge Knox, there was no evidence which afforded any basis for fixing the amount of a reasonable royalty. We think this question was wholly one of fact to be disposed of on settled principles which do not call for exposition.

3. Plaintiff urges that he is entitled to recover interest at six per cent. as to each item of profit from the date thereof as set forth in defendant's account. There is no evidence of wanton infringement. The mere fact that the courts held different views as to the claims of the patent is sufficient to negative any such suggestion.

Metallic Rubber Tire Company v. *Hartford Rubber Works Company,* F. R.
The Philadelphia Rubber Works Co. v. *U. S. Rubber Reclaiming Works, et al.*

In an infringment case, where there is a genuine controversy, it is settled in this circuit, that interest runs from the filing date of the Master's report.

Oehring against *Fox Typewriting Co.*, 251 F. R., 584;
Metallic Rubber Tire Co. v. *Hartford Rubber Works Company, supra.*
The Philadelphia Rubber Works Co. v. *U. S. Rubber Reclaiming Works, et al., supra.*

4. Plaintiff, contrary to defendant's contention was not guilty of laches and there were no intervening rights. Plaintiff has recovered profits only from August 15, 1916, the date of the reissue patent.

The decree is affirmed without costs on this appeal.

In view of the result, there is no occasion to deal further with the Master's motion to dismiss or affirm as to his allowance.

A true copy.

WM. PARKIN,
Clerk.

(Seal)

JAN 4 1923
WM. R. STANSBU
Clerk

Supreme Court of the United States.

[redacted], October Term, 1921.

No. 238, October Term, 1922.

CONCRETE STEEL COMPANY,
Petitioner,

vs.

GEORGE E. VANDENBURGH,
Respondent.

IN EQUITY.

ON CERTIORARI TO THE CIRCUIT COURT OF APPEALS FOR THE SECOND CIRCUIT.

BRIEF FOR PETITIONER, CONCRETE STEEL COMPANY.

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ABSTRACT OF THE BRIEF.

The subject-matter is a patented ironwork for reinforcing concrete. It is not a reinforced concrete structure *per se*. See brief, page 2.

The letters-patent were reissued with broadened claims for a different invention, almost ten years after the original. All courts have held the new claims invalid. Page 51.

The Second Circuit held claims other than the new ones valid and infringed. It did not examine or discuss the prior art: the District Court held no infringement: the Circuit Court of Appeals reversed on that point alone. The Third Circuit held no infringement; its District Court held no validity and no infringement. The Sixth Circuit (D. C. and C. C. A.) held invalidity, and no infringement. The Second Circuit gave other claims the same scope as those declared void. Page 8.

Validity of the Letters-Patent.

The *original* letters-patent are invalid for direct anticipation, in view of the plaintiff's assertion that they disclose and cover "all forms of integral securing means for connecting the spacing bars to the spirals." (Transcript, page 52; Plaintiff's circular.) Many such are shown in the record. Page 39.

The original letters-patent are also void *in toto* for the want of invention. The prior struc-

tures, both in metal-working and in reinforced concrete, are substantially the same as plaintiff's; the differences are trivial; the contentions to the contrary are frivolous. It is "a common mechanical expedient." (C. C. A. 6th Circuit.) Page 39.

The plaintiff's structure has never been employed by anyone; he has sold none of it. The structures taken from the prior art have been used extensively. Plaintiff's sole proof of utility is certain licenses, bought as the price of peace. He is entitled to no indulgence from commercial success. He has done nothing to justify putting the art under tribute. Page 15.

Reissue Defenses.

The reissued letters-patent are void, because:—

The plaintiff had nothing to surrender;

the delay of ten years was too great;

the reissue is not for the same invention as the original;

the plaintiff was guilty of laches, as distinct from delay;

the oath to the reissue application was false;

the claims were unduly expanded to cover what defendant was doing;

the reissue re-asserts a claim (on which defendant has been held) which was cancelled as the price of allowance of the original;

plaintiff is estopped to assert a construction of the reissue which covers a collapsible reinforce. Page 49.

Infringement.

The structure of the original letters-patent (Transcript, page 45) is "rigid"; a beam or "truss"; a "collapsible" truss is impossible and ridiculous. Page 58.

Claim 3 of the original used the word "end," and was allowed after that word was substituted for "edge". There must be *two* "ends," at least; and they must be, as set out in the patent, arranged to make the structure "rigid". Page 27.

Defendant's structure is not "rigid"; it is collapsible. This was *defendant's* contribution, not plaintiff's. Stipulation, Transcript, page 125.

Collapsibility is not an "improvement," as asserted by the court below; it is a complete and radical departure from plaintiff's "rigid" idea. It is a different structure, operating in a different and *antagonistic* manner. Page 34.

Plaintiff's structure has counterpart "ends," disposed symmetrically about a center, giving rigidity. Defendant's structure is asymmetrical in construction, and has no "ends"or "center," in the sense of the patent. Page 87.

The proportions of plaintiff's coil render collapse impossible. Those of defendant make it inevitable. See samples; page 31.

Plaintiff did not invent "spirals" at all. "Column hooping" was forty years old. Page 39.

Reading the claims on defendant's structure "does not prove but only suggests infringement." Judge Hough, Transcript, page 135.

"Claims 5 (original 4) and 3 are in too general language. They go beyond the disclosure, exceed the invention and are false claims unless construed to mean by *retained* rigidly fixed in place, and (5) by kerfs disposed diagonally, kerfs inclined half one way and half the other." Judge Hough, Transcript, page 138. Italics judicial.

"I agree also with Judge Hough's conclusion that plaintiff's invention was not what he now claims and that what he now claims is not thereby disclosed." Judge Westenhaver. Appendix C, page 141.

Plaintiff's idea was a *bar*. He never conceived "column hooping." If his coils are "free of the bar" (Transcript, page 50, claims 1, 2, 4, 6) at one side, the addition of one or more spacers makes a structure different from his. Concrete could not be tamped in a *collapsible* hooping "free of the bar" at one side. Page 154.

ACCOUNTING.

Plaintiff proved only profits from sales of ironwork; he "made no attempt" to apportion between ironwork not made like the patented structure and that conforming to it; nor between plaintiff's rigid structure and defendant's collapsible one. He made no showing of the value contributed by the patent, under either head.

There was no proof of damages from lost sales or of reasonable royalty. Page 93.

COSTS.

Section 973, R. S. U. S., expressly prohibits the allowance made to the plaintiff in this case. Page 112.

LAW.

Page 102.

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Supreme Court of the United States.

No. 674, October Term, 1921.

No. 238, " " 1922.

CONCRETE STEEL COMPANY,
Petitioner,
v.
GEORGE E. VANDENBURGH,
Respondent.

In Equity.
On Certiorari to the Circuit Court of Appeals for the Second Circuit.

Brief for Petitioner, Concrete Steel Company.

Preliminary.

This is an ordinary patent suit upon a reissued instrument; before explaining how it gets into this Court, we state just what it is about, leaving the more detailed consideration of the art and the defenses to other sections of the brief.

The subject-matter, then, is the construction and assembling of the ironwork which is used to reinforce a concrete beam. We ask particular attention to the distinction between the "art of reinforcing concrete", and the construction and assembling of the ironwork which is used in reinforcing it; the two things are not the same, as will be at once apparent from a consideration of the only case which we have found on that subject in the reports of this court, namely,

Bone v. *Marion County,* 251 U. S., 134,

in which the opinion was written by Mr. Justice McKenna. That case did not concern the particular construction of a metal reinforcing; but did concern its assembly with the concrete, *per se;* whereas in the present case, when the metal structure is assembled as an integer, the work is done; it is then immaterial whether it is used for reinforcing concrete, or for any other purpose. This will become apparent in the progress of the case.

The plaintiff's ironwork has only two parts. One of these is a helix of heavy wire, miscalled* throughout the case a "spiral"; the other is a "spacer" or bar, for holding the turns of the helix in "spaced" relation. Both of these are old (admittedly), in many patents, in literature and in public use. E. g.,

---

*The "spiral" is a plane curve; the helix or screw is three dimensional; Judge Hough, Transcript, page 134, with his usual accuracy, calls it a "cylindrical helix". It is sometimes elliptical in cross-section

The Helix,	and	The Spacer.
Considere, 752,523, page 66.		Do.
English, Hyatt, 1874, page 105.		Do.
German, 1892, page 108.		Do.

and others.

Plaintiff alleges novelty in the attachment between the helix and the spacer. His contention goes to the extravagant extent of asserting himself to be the first to devise what he calls an "integral" connection; that is, by some form of clip or hook struck up or otherwise formed from the metal of the spacer. This broad claim has been repudiated by all of the six courts which have dealt with it. Its absurdity is demonstrated by the German patent to Kieserling, page 108, Transcript, as well as others.

Driven to his last ditch, plaintiff then says that his form of attachment, made by biting out diagonal kerfs or slots in one edge of the spacer, leaving diagonal tongues which are hammered down after the turns of the helix are placed in the slots, was new and was an invention.

That, however, was mere ironworking, and is shown in the Norwood patent, page 59, in plaintiff's precise form, in a sand-screen, such as is in common use in preparing concrete. Many equivalent forms are shown in the record. The Circuit Court of Appeals for the Six Circuit has held plaintiff's patent to be devoid of invention on these references. See Appendix C to this brief, page 147. As an ironwork, regardless of its purpose or utility, it has no novelty.

The Court of Appeals (Sixth Circuit) was somewhat guided by its own prior decision in

Berger v. *Trussed Steel Concrete Co.*,
257 F. R., 741,

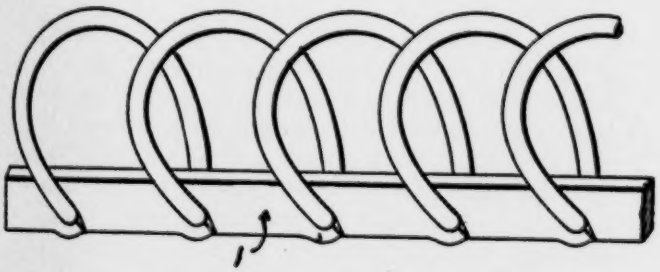
in which it pointed out how common it was to secure one metal part to another by a prong or tongue struck from one of them. We quote this decision in full, page 104 of this brief.

The decision below is based upon a superficial resemblance; that is, the resemblance between the fragmentary figure 4 of the plaintiff's patent, found on page 48 of the Transcript, (Reissue No. 14182), and something independently devised by the defendant in this case. We say this is a superficial resemblance, because the real disclosure of figure 4, as developed from the figure itself and from the statements in the specification, regarding it and other figures, is not used by the defendant; nor, as far as the record shows, by anyone else, nor has a single pound of it ever been made, used, or sold, anywhere by anybody. Plaintiff had every opportunity to prove the use of his structure, but has wholly failed to do so; the only proofs which he has given concerning its commercial availability have been of certain licenses issued at different times covering work *already done* (in an office building, for example), an injunction against which would have been disastrous; this under threat of litigation, the expense of which would have been greater in any event than the cost of the license fees exacted. We believe this has no weight in establishing

utility of the device or in showing that it has such a character as to merit the term "invention"; especially because there is no evidence of the character of any of the ironwork, the use of which was licensed by these contracts. So far as the record discloses, it may have not even a superficial resemblance to what is shown in the letters-patent. The licenses were the price of peace.

The thing which is shown in Figure 4 of the letters-patent in suit is here reproduced exactly.

Fig. 4.



The Court will note that this is fragmentary, and does not purport to represent any unitary structure embodying the disclosure of the patent. The end of the spacing bar marked 1 is broken away, to indicate in the conventional manner of the draftsman that the figure is *incomplete.*

But as shown in the drawings and described in the specification (presently to be quoted), the *complete* Figure 4 would be as follows:

Fig. 4 COMPLETED.

The specification says:

> "Fig. 3 is a detail perspective of the primary and secondary coils shown in Figure 1. Fig. 4 is a similar view of a modified form using one coil."

That is, Figure 4 when completed is, a detail perspective *like the ironwork shown in Figure* 1, except that there is a single coil instead of the two coils forming the preferred form (Figure 1) of the plaintiff's invention. It is not asserted that the defendant makes anything like this.

Further, plaintiff's patent states, page 1, line 80, page 49, Transcript—

> "As a preferred means of securing the coils to the bars I have shown a series of kerfs 8 in one face of the bar inclined to *slant from the center of the bar towards the opposite ends* thereof, and the coils are seated within these kerfs" etc.

The fragmentary Figure 4 of the patent has no "center", being incomplete; and it cannot

show this disposition of the kerfs. But the complete form does show it. As one of the claims held by the Circuit Court of Appeals to be infringed embraces this peculiar disposition of the kerfs, which defendant does not use (as we will point out when we deal with infringement), it becomes important.

Furthermore; this peculiar disposition of the kerfs is a necessary element of the patentee's structure, because it was the plaintiff's idea that the coils, as shown in Figure 1, should *slant away from the center,* so as to oppose one another and bring the strain upon them in opposite directions when the beam tended to bend under vertical stress, making it *rigid.*

As pointed out in our brief more fully, page 27, *this was the idea which the Examiner held to be patentable;* and from it he refused to allow the plaintiff to depart. The structure shown in the original letters-patent with its description (which is identical with that of the reissue); the discussions between the Examiner and the plaintiff as disclosed in the file-wrapper, Transcript, page 115; the limitations insisted upon by the Examiner; the terms of the claims allowed; all show this.

All of this was thrown in the fire when the application for reissue was filed, for the purpose of broadening the claims, nearly *two years* after the original patent issued, and after the defendant had acquired intervening rights; see page 68 of this brief.

If the Court shall be of the opinion that this is what the plaintiff "invented," then whether the patent be sustained or held invalid, it must

he held that the defendant does not make, use, or sell it; and the public does not. With the scope which plaintiff insists his patent should have (to cover *any form* of integral fastening between the spacer-bar and the coils) the claims are so absolutely invalid as to be beyond discussion; as indeed all courts have held as to the new claims 1 and 2 of the reissue.

But Judge Geiger, in

> *Johnson* v. *Browning, King & Co.*, 277 F. R., 315 (330)

has well expressed the rule of law in this language:

> "In any event, upon the issue of infringement, claims 2 and 3 should not, by construction, be given a breadth practically coincident with claim 1, or disallowed claims 2 or 5."

That is what the Circuit Court of Appeals has done in this case.

Why The Case Comes Here.

The Court will probably remember the circumstances under which the *certiorari* was allowed in this case. (Italics throughout this brief are ours, unless otherwise stated.)

The plaintiff, Vandenburgh, had patent No. 841,741, issued January 22, 1907, for a means of reinforcing concreate construction; applicable, as

petitioner believes, to *beams,* but not to what is now termed "column-hooping". Page 45 of the Transcript.

Certain correspondence with the defendant, petitioner in this case, was had which was stipulated into the record and begins on page 127, being Defendant's Exhibit D; in this the claim of infringement of this *original* letters-patent was set up and was repudiated on the ground that the plaintiff's original letters-patent disclosed and claimed *only a rigid construction,* while what the petitioner made was collapsible.

Apparently, plaintiff *acquiesced* in that interpretation of his original letters-patent. It is the petitioner's contention that his acquiescence is an estoppel to assert any different view now. At any rate, the threatened suit was not brought. The correspondence was in the summer of 1916, some nine years after the issue of the patent.

As a consequence of this correspondence, which terminated in June, 1916, the plaintiff hastily prepared a reissue application, which was filed July 1, 1916, and is found at page 48 of the Transcript; within six weeks, on August 15th, his letters-patent were reissued, with claims which it is asserted read directly upon the petitioner's construction. We here relate only the sequence of events.

In January of 1917, plaintiff wrote again to the petitioner; the letter is found on page 131 of the Transcript, endeavors to negotiate a license, and impliedly threatens to sue. No attention was paid to this letter and the bill of complaint was then filed.

The District Court, Judge Hough presiding, dismissed the bill for the want of infringement. The opinion is found on page 134 of the Transcript. *Only a cursory reference to the prior art was made,* as the Court thought the case so plain that none was needed. *Defendant has never had its day in court on the validity of either the original or the reissued letters-patent.*

The Circuit Court of Appeals, page 150, Transcript, reversed Judge Hough's decision of non-infringement, and held (with no discussion whatever of the defenses) that the patent was valid and infringed. As expressed by another Court in considering this opinion (Judge Westenhaver, Appendix C, p. 131), the Court seemed to consider that Judge Hough had considered the prior art and held the patent to be valid; which is not the fact.

The case then went to a Master, whose report is found on page 314 of the Transcript; he awarded a judgment which amounts to about eighteen thousand dollars. Exceptions were taken and the District Court, Judge Knox presiding, confirmed the report of the Master, page 345 of the Transcript. The Circuit Court of Appeals, speaking by Judge Mayer, affirmed the decree below; erroneously, we are sure. Page 398, Transcript.

Judge Mayer naturally and correctly thought that he could not go behind the former opinion of the Court, which settled the law so far as the case was then concerned. Immediate application for *certiorari* was made, and the plaintiff has very properly preserved the *status quo,* pending the decision of this Court.

Other Suits.

In the meantime, the plaintiff had brought two other suits, one of which was against the Electric Welding Company in the Third Circuit. In that case, Judge Orr, who is very experienced in this concrete art, decided that the patent was invalid and also was not infringed; not reported: Appendix C to this brief, page 119. The Circuit Court of Appeals, speaking by Judge Buffington, said that he "made no error in dismissing the bill," holding that the construction of the Electric Welding Company was not an infringement "assuming" that the patent showed invention: 263 F. R., 95, Appendix C, page 126. It is our thought that this invalidates the patent in the Third Circuit, as Judge Orr's opinion is now the law there.

The third litigation was against the Truscon Steel Company in the Sixth Circuit. In that case, Judge Westenhaver in the District Court said that while he might evade the issue of validity by holding that the defendant's structure did not infringe (the differences between it and the patent being as great as those referred to in the *Electric Welding case*), he would not do so; he considered the prior art very fully and held that the patent was void for the want of invention; not reported: Appendix C, page 119. It should be noted that what he held to be without invention was *not the particular language* which described the plaintiff's structure, but the *construction.*

The Sixth Circuit Court of Appeals also refused to base its decision on infringement; on an

independent review of the art it affirmed Judge Westenhaver's decision that the structure of the plaintiff was without invention; or, as expressed there was "a common mechanical expedient." 277 F. R., 345, Appendix C, page 142. Vandenburgh filed an application for the writ of *certiorari*, which your Honors have granted.

Also a petition was filed in the Court of Claims, upon which so far no important steps have been taken. Appendix F to our petition for *certiorari*.

The United States, by the Solicitor-General, have filed as *amicus curiae* a representation to the Court, asking that if the writ be granted in our case they might be permitted to show the interest of the Government in the decision. As this action was criticized in the reply brief of the respondent, we may add that the request went no further at that time; it was obviously proper, in view of the fact that if the patent should be sustained the United States were liable for a large recovery.

It is requested that, as there are questions in common, the two cases may be assigned for hearing at the same time. There are sufficient differences between them to raise some different questions, so that they cannot be properly consolidated, as we believe; but of course both cases raise the question of validity, and if that be decided adversely in the one case, it will control in the other, since the records are, while not identical, substantially so.

THE DEFENSES.

I. The reissued letters-patent are void.

A. Because the original letters-patent were without invention, in view of the prior art;

B. Because the reissue was applied for nine years and six months after the original had left the Patent Office, without explanation of the delay;

C. Because the oath accompanying the reissued application was perjurious, in that it stated that the reissue had been applied for "as soon" as the alleged errors were discovered, which the inventor has admitted, under oath, was not true.

D. Because the reissue was illegally broadened to cover matter not disclosed in the original, and is therefore not for the same invention.

II. The defendant, petitioner in this case, does not infringe either the original or the reissued letters-patent.

A. Because the specifications of both the original and reissued letters-patent show that Vandenburgh's idea was one of rigidity only, a two-way "truss"-like structure;

whereas defendant makes a one-way collapsible structure; of which Vandenburgh had no conception.

B. Because the inventor is estopped to contend that his original letters-patent covered a collapsible structure, in view of the denial by defendant, petitioner here, of infringement of the original letters-patent, and the reissue with expanded claims "to catch manufacturers like defendant"; (Judge Hough, page 138, Transcript, top).

C. Because defendant's structure does not respond to the terms of the claims, as construed and defined by the Circuit Court of Appeals.

III. Assuming that all of these defences, any one of which we believe sufficient, are found against us; nevertheless the master, the District Court and the Circuit Court of Appeals fell into grave error in stating the account in holding.

A. That there was no standard of comparison set up;

B. That the burden was on the defendant to prove anything at all in the accounting;

C. That the collapsibility of the structure did not affect the sales;

D. That anything was due the plaintiff;

E. That the plaintiff had made any impression on the art by which he was entitled to claim either royalty or profits from the use of his invention.

If the Court shall be of opinion, as we think it should be, that the plaintiff has made no invention in view of the prior art, all of the latter parts of our brief (after page 46) will be unnecessary and need not be read.

As it is an important consideration to know *just what effect the alleged invention has had upon the practice of manufacturers or users,* we here state what the record shows and what the Courts have said regarding Vandenburgh's position in the commercial art.

Vandenburgh's Position in the Commercial Art.

Judge Hough, District Court—Record, page 135:—

"Nor, on the other hand, shall I spend time in dwelling on the 'paper' nature of this patent. The style of strengthener for concrete now called infringing has been in growing use since 1907,

but there is no proof at all that plaintiff has contributed to that growth,

unless one is to believe that the mechanical world was moved by Fig. 4, the only portion of the disclosure suggesting even now defendant's device."

Judge Orr, District Court—Appendix C, page 124:

> "There is *no suggestion throughout the record* that the bar of the plaintiff has met any predetermined engineering demands in concrete construction."

Judge Westenhaver, District Court—Appendix C, Page 140:

> "The evidence shows that commercially he (plaintiff) has *contributed nothing whatever* to the progress of reinforced concrete construction. *No buildings or columns were ever constructed by anyone under his patent* prior to 1916. Two licenses only have been issued by him, the first in the latter part of 1916, under which no business appears to have been done except *perhaps* to put up one structure, and the other followed the favorable decision in the Second Circuit."

(The learned judge did not know it, but Judge Orr's decision terminated that license; or more accurately, left *in the licensee* the exclusive right for all the United States save the Pacific Coast, without royalty or accountability: see Johnson [Corrugated Bar Company's] license, page 259, record.)

C. C. A., Second Circuit, this case—Record, page 151, bottom:—

> "The defendant's witness Cummings frankly admits that this form of reinforcing structure *was new in cement work* and has come into general use."

(This gravely erroneous statement was all the Court said. Mr. Cummings, however,

A. Was *not* defendant's witness.

B. Was not speaking of the patent in suit at all.

C. Did *not* make the so-called "admission" stated, either in terms or effect.

D. Was speaking of *his own structure*, which his Circuit Court of Appeals held did not infringe. 263 F. R., 95. Appendix C, page 129.

E. Had no power to "admit" the voluminous prior art out of the case.

F. The record shows the contrary.

What Mr. Cummings *did say* [Record, p. 26, Q11 *et sequitur;* see page 36, this brief] bears no resemblance to the Court's statement. He did not *so much as mention* Mr. Vandenburgh, his structure, or his original or his reissued letters-patent, in any part of his deposition appearing in this record.)

C. C. A., Third Circuit—Appendix C, page 128, 263 F. R., 95,

> "In the nine years between its grant and the filing of this bill, Vandenburgh's patent *made no impress in this art.*"

C. C. A., Sixth Circuit—277 F. R., 345. Appendix C, page 149:

> "We are not impressed that the advance in reinforced concrete is due in any substantial measure to Vandenburgh's contribution."

Scope of Claims.

The first thing which the Court must determine is the scope which is to be accorded to the claims of the letters-patent in suit in view of its position in the commercial art. If that scope is narrow and restricted, the range of prior art applicable thereto must be quite specific in order to meet the claims. On the other hand, if a broad interpretation is to be put upon them, then a much wider range of art is available for reference. In this case, we are content to take the plaintiff's own interpretation of his patent upon the issue of validity, and therefore we consider its scope, *as assigned by him;* premising that letters-patent cannot be given narrow scope for *validity,* and broad scope for *infringement.*

The plaintiff assigns the broadest possible scope to his patent, and of course must be bound by his contention in that behalf. That is to say, if the claims are to be so broadly construed as to cover what he says they cover, then any reference showing anything coming within the broad scope assigned is sufficient to invalidate his patent. We make no distinction here between the original and the reissue.

We are not left in the dark as to what he asserts his claim to be, outside of the language of the patent itself; because he has furnished as his Exhibit No. 7, page 52 of the Transcript, a circular which was scattered broadcast throughout the trade, giving his interpretation; a copy of which was received by the defendant, pe-

titioner in this case. One of the statements therein is this:

> "INTERLOCK SPIRALS can only be used where they bear the proper license tags under patent No. 841,741, Jan. 22, 1907, and reissue patent No. 14,182, Aug. 15, 1916; BASIC U. S. PATENTS *on all forms of integral securing means* for connecting the spacing bars to the spirals. *All* others are infringements and notice is hereby given to all users and manufacturers to discontinue the manufacture, use and sale of such bars immediately".

Of course there is no "patent No. 841,741", after its surrender.

That is plaintiff's own interpretation of what he had invented. Therefore, if there was in the art *any* form of "integral securing means", the patent must be held invalid; and no detailed language can save it, because the plaintiff's own representation estops him to contend that his invention lay in some specific and particular aspect of the assemblage of different elements. It is not enough, therefore, to save the patent to show (though that has not been shown) that although each of the individual elements of which it was composed was old in itself, nevertheless the combination of them was new, and therefore deserved the name of invention. No such claim has been set forth to the trade; but on the contrary, the whole gist of the patent has been asserted to be, as we see, "*all forms* of integral securing means". If it is integral, and if it secures the wire to the spacer, it infringes, according to plaintiff.

How unfounded any such contention is must be manifest from this record. See page 39 this brief, "PRIOR ART". As long ago as 1892, the German patent to Kieserling shows a form of "integral securing means", the very form adopted by the Truscon Steel Company, defendant in the suit in the Sixth Circuit, also now before this Court; which the plaintiff there had the temerity to assert was *the same as his invention.* It *is* the same as his invention. He himself has said it. But it immediately destroys any pretense of novelty in the alleged combination set out, and plaintiff is estopped by his own representation to contend that there is any patentable distinction between the Kieserling structure and his own.

There is this *unpatentable* difference between them; Kieserling uses square notches in the edge of his spacer G, in which the helix is wound; whereas the plaintiff uses, as far as his drawings are intelligible, a diagonal notch or kerf, leaving a spur. The difference is clearly not patentable, in view of the references which show the identical form of spur used by the plaintiff (see Norwood, page 57, or Drawing No. 8, or Eason, page 63, or Drawing No. 10, and many others); and the peening of the square notch is so common an expedient in metal working as to make any assertion of "novelty" in that respect ridiculous, as the Sixth Circuit in effect holds; not only a "mechanical expedient"; a "common mechanical expedient". 277 F. R., 348. See, for instance, Prescott and Bennett, page 55, or Drawing No. 7, hereafter described.

Under these conditions, we accept the assertion of plaintiff that his patent aims to cover "*all forms* of integral connection" between the spacer and the helix. He cannot complain of that, since we only take him at his word.

But also we must accept the line of cases which holds that "what would infringe if later would anticipate if earlier", of which

Peters v. *Active Manufacturing Company,* 129 U. S., 530;

and

Knapp v. *Morse,* 150 U. S., 221;

are examples. There are many others.

Therefore, inevitably and "rigorously", as the mathematicians say:

If the device of the Truscon Company infringes, as plaintiff says (and it is plainly a "form of integral connection") then the device of Kieserling—which is just as plainly identical with it—is an anticipation, direct and positive. No invention is present, in any event.

Real Disclosure of Patent.

This must be ascertained from the specification and drawings, and cannot be found from

any statement of counsel, or by interpretation of a witness.

Now, it is evident from the text and drawings that he was after a *beam, bar or truss*", which is inherently and necessarily *a stiff structure.* The whole idea of a beam or "truss" (the patentee's word) is of a horizontal structure to span an opening. Inherently such a structure *must* be stiff or *rigid.* Flexibility, or "collapsibility", is out of the question. It is true that it might be made reasonably stiff by the concrete if the ironwork were collapsible; but that was not the inventor's idea. That is, by stipulation, *defendant's* idea, exclusively; as a "natural and obvious" matter; page 133, Transcript. Throughout, Mr. Vandenburgh is *speaking in terms of a rigid structure;* and so far from its being an "inadvertence" in his original letters-patent is it for claims 1 and 2 to speak of a "spiral coil *rigidly* secured", that it was the *correct* expression of the inventor's idea, and no other is; the beam was horizontal, and was intended to be *stiff*, irrespective of the concrete which it reinforced.

We assemble here the statements in the specification of the reissued letters-patent, found on page 48 of the Transcript; Page 1, line 16:

> "The invention has for an object to provide a reinforcing bar with one or more spirally disposed coils secured to the bar so as to provide an extended area of contact adapted to resist strain longitudinally and laterally of the bar and *to form a truss within* the body of concrete or other plastic material which provides the maximum of

supporting strength in the *arch* or surface to be formed".

The implication from this is that it is a beam; "the arch or surface to be formed" can be only a beam, not a column, and so is the description of the figures themselves. For example, line 29:

> "Figure 1 is a vertical section showing the bar applied to supporting *girders or beams.* Figure 2 is an enlarged vertical section on the line 2-2, Figure 1. Figure 3 is a detail perspective of the primary and secondary coils *shown in Figure* 1. Figure 4 is a *similar* view of a modified form using one coil. Figure 5 is a detail plan of the form shown in Figure 3".

With the column of Figure 6 we deal presently. All of these structures of the letters-patent are shown arranged *horizontally.* None of them is vertical. None of them is intended for a column; and none of them, of course, disclosed "column hooping", as it has come to be known in the art. Figures 2 to 5 are said to be details of *the structure shown in Figure* 1; other views of the same thing. There is no idea at all of the column embraced in any of them, and obviously each of them must show a stiff structure; and such is the description even of Figure 4, upon which this fantastic allegation of infringement is based. Page 1, line 57, the patentee says:

> "*The bar* may be provided with a primary coil 6, extending in one direction, as shown in Figure 4, which is sufficient in light con-

> struction; but when a heavier construction is to be used a secondary coil 7 is provided, which extends in the opposite direction to the coil 6 and through the same so as to cross *beneath* the coil 6 at a point directly *above* the bar, thus providing a construction in which all lateral pull or strain of the coil is avoided, owing to the equalization thereof by the oppositely extending coils and the *tendency of the coils to move or flatten toward the face of the bar resisted.* This preferred construction is shown in Figures 1 and 3, and it is also desirable that both of the coils be *deflected away from the center* of the bar, as shown in Figure 1, as the greatest supporting strain carried by the arch is at the center thereof, and this deflection therefore resists such strain and tends to draw the coils upwards *into a position at right angles to the bar".*

So also on the same page, he states that the bar marked 1 in Figure 1

> "provides the necessary strength upon which *the truss structure formed by the coils* is carried."

The whole central fundamental idea is a truss structure "within the body of concrete"; *not* a truss structure formed by the concrete and the iron together, but a truss structure "*within* the body of concrete", *formed by the ironwork* ("the coils") *alone.* To attempt to extend this to a collapsible column-hooping is pure effrontery, and ought not to be countenanced. It is traveling far outside the inventor's idea. It resembles in no particular our column shown in the circular, Plaintiff's Exhibit No. 5, page 51. The

structure there shown is not illustrated or described in the original or reissued patent.

Vandenburgh Did Not Contemplate Two Spacers Upon the Same Coil.

Consider the column shown in Figure 6. It will be noted that the claims (Nos. 1, 2 and 4) say that the coils are

> "free of the bar at the opposite side therefrom to the securing point".

The same idea is in different words in claim 2. That is an accurate description of the column shown in Figure 6, of the coil of Figure 1, and of the details in Figures 2 to 5. Figure 6 specifically shows two sets of two coils each, attached to the spaces 1-1; and carefully *avoids* connecting the coils attached to the left-hand spacer to the right-hand one, and *vice versa;* that is, it carefully *preserves the construction indicated in the claims referred to, in that each coil is secured on one side and is "free of the bar" on the other.* This must mean free of any "bar" (spacer) on the other side; as the coil could not be attached to the *same* bar on both ends of a diameter, of course.

That also is not the form of structure shown in Plaintiff's Exhibit No. 7, page 52; there the plaintiff has illustrated a common and well known form of column-hooping, independently devised *by the defendant* in this case, as set out on page

133, never made by the plaintiff, never indicated in his patent; boldly appropriated by him from the disclosures made in the circulars of defendant. The patent itself indicates *rigidity* in every line and sentence. That was the primary object which the inventor had in mind, and it is of record that

> "Nobody connected with the defendant company ever saw a device of the character in suit which was built by plaintiff or anybody associated with plaintiff; that the devices manufactured and sold by defendant, of which plaintiff's exhibit 3 is a specimen, were designed independently by defendant and were not copied from anybody * * * that the slotting of the longitudinal member to receive the spiral strands and the subsequent fastening of the strands therein by hammering together the open ends of the slots so that the spiral could be collapsed during shipment and at the same time retained within the slots, was a construction *independently worked out by this defendant* and particularly without any knowledge of plaintiff's patent or of plaintiff's alleged invention and as a NATURAL AND OBVIOUS MEANS OF SECURING THE SPIRAL TO THE LONGITUDINAL".
>
> Transcript, page 132, bottom.

If therefore the plaintiff admits that this method of attachment was a "natural and obvious means of securing" the spiral and spacer together, surely he admits unqualifiedly that there is no invention in using it!

Figure 6 is not alleged to be used by the defendant; we point out that it is the *only* form of column shown by the patentee; and the presumption is that he never devised or conceived of any other form of construction of columns as embodying his invention. The record does not disclose that a single pound of his form of reinforcement was ever made, used or sold by anybody; as to Figure 6, a little consideration will show that its complicated interweaving of rods over 100 feet long is quite impracticable.

The Scheme of the Original Patent as it Appeared to the Patent Office Examiner.

(See our "Preliminary", page 1).

A study of the original letters-patent, page 45, including not only the claims in suit said to have been brought forward from the original to the reissue, but also the remaining claims and the text of the description, will show at once that the Examiner of the original application of 1906 had a consistent and logical conception of an integral scheme as embodied in the patent application, claims for which he was willing to allow, and which corresponds with what we have just described; and that the present interpretation given to the patent by the claims of the reissue and by the inventor and his counsel is inconsistent with that scheme, and indeed contradictory of it; and claims describing it were rejected and cancelled, as the price of

issue. Under these circumstances, the language from

Leggett v. *Avery*, 101 U. S., 259;
Mahn v. *Harwood*, 112 U. S., 354;

and

Eby v. *King*, 158 U. S., 366

applies with full force. See page 66 this brief. As in those cases, so in this, the application for the reissue is only a substitution of the judgment of the Commissioner and Examiner of the date of reissue for that of those officers at the date of the original grant; this the cases above and many others uniformly condemn.

The idea of the Examiner was this: This structure submitted to me is composed of two counter-parts, disposed upon opposite sides of a vertical median line or center; that is, two *ends*. These counterparts are so disposed that the strains in one act in the opposite direction to the strains in the other, making a stiff or rigid structure; and that is effected by having a coil (as in Figure 4) or coils (as in other figures) so disposed that it tilts away from the center *in opposite directions* upon the two ends, and stiffens the bar until the ironwork forms a truss; in the language of claim 4 of the reissue and claim 2 of the original, "said coils being deflected in opposite directions from the center of the bar toward the ends thereof"; and in the language of claim 1 of the original, being "rigidly secured" in place.

Even that was not new; but anything outside of it the Examiner consistently and uniformly

rejected, as in the rejection of the original claim 3, found on page 116 of the Transcript; and eventually the attempt to obtain something beyond it was abandoned, and claim 3 (and others) *cancelled.* The alteration of claim 3, (See page 64, this brief) or substitution of a new claim 3, therefore, so that it should specify that it applied to a structure having *"ends,"* was consistent with the whole idea which the Examiner appeared to have in mind; and his acceptance of the modified form of the claim, using the word "end" instead of the word "edge", makes that very plain.

If it be argued that claim 5 uses the term "edge", and not the term "end", which is true, the answer is plain enough from the language of that claim itself; for it proceeds to say that the kerfs are formed so that each has an "overlapping integral spur *projected toward the center* of the bar". That could not be true if the spurs all projected in the same direction. See pages 3 to 6, this brief. And "center" does not mean, as might be argued, the *horizontal* axis of the whole structure including the concrete, or the axial center of revolution about which the coil is formed; because, as will be seen from the figures, the spurs project *away* from that center. Therefore claim 5 is not only *not* inconsistent with the Examiner's idea, but it is wholly inconsistent with any other. These spurs must *reverse in direction at the center;* and thus only would there be a symmetrical structure.

All this was thrown to the winds when the reissue application was filed. Its claims 1 and 2, embodying an idea *never presented* to the Pat-

ent Office in the original and claim 3, reinstating the cancelled claim *repeatedly rejected* because inconsistent with the disclosure of the specification, were mere attempts to obtain from the Commissioner and Examiner of that day protection for an invention which had never been made by the applicant, and which, so far as it was ever submitted to the Commissioner and Examiner at the time of the original grant, had been repeatedly rejected.

Under such circumstances, it cannot be that the reissue should be sustained at all. It is a distinct and deliberate attempt to defraud the public out of something to which, even if the invention had ever been made by the applicant, it had become entitled by dedication. Not only the rights of this defendant, but those of the public at large, have been set at naught by the decision in this case.

The whole underlying idea of the patent was, a rigid bar symmetrically disposed about a center, with coils on the two ends, deflected in opposite directions from the center. Anything outside of that was never conceived by the plaintiff, and should not be secured to him now. Defendant does not use that.

We discuss the validity of the reissue, *quo* reissue, on page 49, etc., this brief.

Necessary Characteristics for Collapsibility not Present in Patent.

Of all the judges who have dealt with this subject, Judge Hough, who decided this case in the District Court, is the only one who has analyzed the structure judicially so as to show the inherent absurdity of the claim that Vandenburgh contemplated a collapsible structure. He said (p. 134, Transcript):

> "Defendant makes and sells a 'collapsible spiral' (deft's Ex. 5, p. 6), used for strengthening concrete construction, consisting of a cylindrical helix of steel wire fitted (usually) to two "spacers' a diameter apart, and each engaging every convolution of the helix, *of which the rise is so slight and the engagement with the "spacers' so loose that the construction which is normally stove pipe shaped, can by moving the metal rods called 'spacers' longitudinally in opposite directions be flattened out and then conveniently crated for transport.*
>
> • • • • • • • • • • •
>
> (Page 135).
>
> To this apparatus there are two essentials, one that the helical convolutions be close, and second that the wire be so fastened to the 'spacers' that it can turn in place; unless both of these conditions are fulfilled it cannot collapse."

All this is absolutely correct. If the turns of a coil be so far apart as to show in side

elevation a triangle with a substantial base, the coil *cannot* be collapsed, if the base points be held apart, either rigidly or loosely. The condition is as stated by Judge Hough; that is, the two points of the base of the triangle must be reasonably close together, the limiting feature being the amount of flexibility in the coil and looseness in its attachment which will permit its tilting. Under these conditions, collapsibility is provided.

Plaintiff contends that its structure shown in Figure 4 embodies this collapsibility. When constructed according to the proportions shown in the original Patent Office drawing, page 45, this is not so, even if only the part of a beam shown in Figure 4 is used. There the base and height of the triangle are substantially in the proportion of 2 to 3. This will not collapse; indeed cannot be made to do so without deformation.

The proportions shown in the drawing of the reissued letters-patent are very slightly different. They do not affect the proposition, so far as collapsibility is concerned; if they do, there would be a variance which would be fatal to the reissue; that is, if the structure shown in Figure 4 of the original would not collapse, and that shown in Figure 4 of the reissue would, then the reissue is not for the same structure.

The *whole structure* of which Figure 4 shows only a part should be considered; and as the coils are wound in opposite directions; and as the pulls are in opposite directions; and as the central, or triangular, turn is of such a character that it cannot be collapsed; and as the col-

lapsibility of the two ends of the coil, if it were present at all, would be in opposite directions; it is as certain as language and drawing can make it that the inventor *never had any idea at all* of making a collapsible structure. See page 58, this brief.

Even if all this reasoning were unsound and even if all the undisputed facts upon which we have based it were not present, nevertheless it is *admitted by the stipulation*, Trans., p. 133 that the method of making the defendant's structure collapsible was original with the defendant, and was not due to the plaintiff at all.

Mr. Vandenburg's whole idea was to use a spacing bar with a coil of wire so arranged upon the bar that without the use of any other spacer than the one, and with the turns of the coil "free of the bar" everywhere but at the points at which they are attached to the one spacer he would get a rigid structure, independent of the concrete. The whole underlying idea was that of *rigidity*. As Judge Hough says, page 137 Transcript, folio 411:

> "This is Vandenburgh's invention; he never disclosed collapsibility; what he shows will not collapse; what he does show bears scarcely a remote resemblance to what defendant makes and sells."

and on page 138, second paragraph:

> " * * * claims 1 and 2 originally called for a spiral coil 'rigidly' secured to the reinforcing bar; as a reissue the phrase is 'permanently' secured. The evidence makes it

> plain that *this change was made to catch manufacturers* like defendant, but I shall not consider intervening rights because it is thought clear that *rigidly* is exactly what the patentee meant. This is seen from the nature of his 'truss' and the representations made in argument to the Examiner",

referring further to the file wrapper.

No part of this reasoning is disapproved or answered by the Circuit Court of Appeals. It only asserts that defendant's device is a "commercial improvement" which provided collapsibility. It was a reorganization which gave utility to a useless thing. The *thing plaintiff devised* cannot be made to collapse, by "improvement" or otherwise.

The Mistake of the Court of Appeals Concerning Mr. Cummings's Testimony.

Our Circuit Court of Appeals in its first opinion (258 F. R., 143, Transcript, p. 150) said (151):

> "The defendant's witness Cummings frankly admits that this form of reinforcing structure *was new in cement work* and has come into general use".

Its whole decision is based on this fundamental error.

Nowhere does Mr. Cummings say that; or anything which by any latitude of interpretation ought to be called its equivalent. Plaintiff was repeatedly challenged to point out *in the record* where Mr. Cummings had said any such thing, and could not do so.

NOWHERE IN HIS DEPOSITION (OF 28 QUESTIONS) DOES HE MENTION THE PATENT IN SUIT AT ALL!

Mr. Cummings was *not "defendant's witness"*. He was the defendant's witness in the suit in the Third Circuit against the Electric Welding Company and was indeed the president of that corporation, and the man who designated its ironwork, being a skilled engineer. His testimony was introduced in this case by stipulation at the solicitation of the plaintiff, in order to avoid the expense, and perhaps the impossibility, since he was hostile to the patent, of taking it a second time; and the certain impossibility of producing him in open court in the Second Circuit. This is not a very important distinction, but it does have some bearing upon the weight to be attached to such a statement (if he had made it) as the Court thinks he has made, since it would be against his interest. Being plaintiff's witness, it does not have that additional weight.

But in order to contrast most forcibly what Mr. Cummings *did say* with what the Court *thought he said*, we quote his testimony, beginning on page 26, Transcript, and ending on page 28, as follows:

"Q. 11. When did the *Electric Welding Company* first manufacture the column reinforcement consisting of a *spiral with two* oppositely disposed vertical bars, such as shown in Plaintiff's Exhibit No. 1? A. Some time during the year 1911".

(Mr. Vandenburg's patent, does not show that at all!)

"Q. 12. Mr. Cummings, out of the four patents presented by you and offered in evidence as your own patents, I understand none of them in any way discloses anything at all with respect to spiral concrete reinforcing. A. None whatever".

(Mr. Vandenburgh has no claim to "spiral concrete reinforcing").

"Q. 13. When you were using a series of hoops, you must have welded or riveted the joint for each hoop, must you not? A. Yes.

Q. 14. This would make an enormous number of joints in a good-sized building, would it not? A. Yes.

Q. 15. In the same building, *if spirals were used in place of hoops,* there would be only a few joints and those few would be easily made, would they not? A. Yes".

("Spirals in place of hoops" were forty years old).

"Q. 16. Then this would be an advantage in that form of construction? A. Yes.

Q. 17. A practical advantage or a commercial advantage, of great commercial advantage in fact? A. Yes, of great commercial advantage.

Q. 18. The possibility of collapsing the spirals is of considerable advantage in shipping, is it not? A. In shipping, yes".

("What he (Vandenburgh) shows will not collapse". *Judge Hough.*)

"Q. 19. And that is still a further advantage? A. No, sir, that is the only advantage they have, otherwise, they are a disadvantage.

Q. 20. Do you mean to say that the advantage you told us about the joint has now disappeared? A. No, sir, not necessarily. That is incidental, just like collapsing. The other is not incidental.

Q. 21. In other words, there is an advantage in only having a few joints? A. Collapsibility is incidental to that type of construction.

Q. 22. Is it not also true that as a manufacturing proposition, it is much easier *to make a single long spiral* than a series of rings? A. Yes.

Q. 23. Is it not also true that it is easier to assemble the spiral unit than a unit made of a series of rings? A. No, you have the same number to put down in each case.

Q. 24. But would it not be more convenient to put up a bundle of longitudinals than to pick up a number of separate rings? A. We have not found it so.

Q. 25. Will you tell me why you abandoned the use of rings and adopted the spirals? A. Because of the joint.

Q. 26. Then there is a gain by that change? A. Yes, a manufacturing gain".

(A gain inherent in the old helix or "spiral").

"Q. 27. What experience had you, of your own knowledge, of *spirals with integral*

fastenings to longitudinals in use prior to 1907 and 1908? A. No practical experience, except what I obtained from books".

(All courts have denied that to be Mr. Vandenburgh's invention).

"Q. 28. And prior to that time, contractors used wires to secure the spirals to longitudinals? A. *As far as I know,* they did, yes."

It seems very clear that what the Court attributed to Mr. Cummings *was never said at all,* by Mr. Cummings or anyone else; and that what he did say was with reference to his own structure (Q. 11, above) made by the Electric Welding Company, which his Circuit Court of Appeals (263 F. R., 95) declared did not infringe the Vandenburgh patent. Of course, if it does not embrace the construction of Vandenburgh, nothing which he said about it can be attributed to that patent. What he did say was that the so-called spiral or helix had an advantage over independent rings or hoops, such as he had been using and had described in his patent (Transcript, p. 90) and that (obviously when constructed according to the method *of the defendant in this case*) *when collapsible* these show "great commercial advantage"!

This is far from saying that the construction *of the Vandenburgh patent* was *"new in cement work"*! If he had said that, it would not have been true; and it will be noted that in the only place where he says that contractors had used a wire tie to hold the longitudinals and coils together, he properly qualified it by saying "as far as I know" they do.

But Mr. Cumming's statement does not bind us; he was not our witness, not a partner in our concern, nor privy to the present suit in any way, and had no authority to make statements which would bind us. Furthermore, and more important than that, the references in this present record show that the continuity of the coil as distinct from the separate hoops of Cummings had been *known for forty years.* Mr. Cummings has no power to strike out of the case the references which we have assembled and now bring to the attention of the Court; and certainly a decision of the Court of Appeals which gives that effect to his statements about his own construction, and ascribes and attributes its advantages to the unmentioned Vandenburgh patent, is so far wrong, so radically incorrect, that the decision itself is erroneous *in toto.*

Validity.

I. THE ORIGINAL LETTERS-PATENT ARE INVALID FOR ANTICIPATION, IF THEIR SCOPE IS AS CLAIMED BY PLAINTIFF.

II. THEY ARE INVALID IN ANY EVENT FOR WANT OF INVENTION OVER THE PRIOR ART.

III. THE REISSUE WAS UNWARRANTED AND INVALID. (See Reissue Defenses, p. 49.)

The Prior Art.

We have shown that Vandenburg's whole idea was a *rigid beam,* composed of a helix with turns slanting in opposite directions from its middle point and attached rigidly to a spacer, only a single spacer being used, except in the case of Figure 6, and *in no case* showing a coil attached to *two* spacers; that the device was not collapsible, but formed a truss; that the defend-

ant's device is collapsible, does not form a truss, and was independently devised by the defendant, as is conceded, as "the natural and obvious" way of attaching the coil of wire to the two spacers so as to make the device collapsible; and that no part of this was due to any knowledge of the plaintiff's patent.

This brings us to a discussion of what is shown in the prior art; because, even assuming the validity of the plaintiff's patent, if the same result had been accomplished by others, then we may take from the prior art the elements of his structure and combine them in any way we see fit; if we do not use his fundamental idea in making this combination, then obviously we do not infringe. And furthermore, if the assembling of the elements, even in the exact form shown by plaintiff, is "the natural and obvious" way of assembling them, then equally naturally and obviously there is no invention present, and the plaintiff's patent cannot be sustained.

We have had prepared for the convenience of the Court a series of drawings showing a part of the prior patented art, which are appended to the brief and are called Drawing Nos. 1 to 14. Colored copies, more convenient than large charts for a Court of many judges, are bound in separate sets; they differ from those in the brief only in being colored. Briefly they are as follows:

DRAWING No. 1

shows *the helical coils* in the reinforced concrete art, and in analogous branches of the metal-working arts. (To any objection that

these metal-working arts are not available as defenses, we oppose the opinion of the Circuit Court of Appeals for the Sixth Circuit in the case of *Vandenburgh* v. *Truscon Steel Company*, also now before this Court; Appendix C to our brief. That Court said, bottom of page 147 or 277 F. R., p. 348, middle):

> "We recognize that the use of diagonal kerf and overhanging spur method of connection in a non-analogous art did not anticipate the combination claim in question; but we are not considering anticipation, but invention, and the prior art in question is thus not irrelevant".

Citing:

> *Day* v. *Mountain City Metal Co.*, 264 F. R., 963; *Berger* v. *Trussed Steel Concrete Co.*, 257 F. R., 741, both in the Sixth Circuit.

DRAWING NO. 2

shows in its upper part the *spacers* used in the concrete art, and in its lower part the spacers used in the metal-working art. Of the latter, two are screens for sand and gravel, such as are used in preparing concrete all over the world, and two are respectively a concrete and a metal fence post, used to space line-wires apart.

DRAWING NO. 3

shows examples of "*integral securing means*", which is the definition of plaintiff in his Ex-

hibit No. 7, page 52 of the Transcript; *"all forms of integral securing means"*. The McClure patent and the Barnes patent show the identical means used by plaintiff, showing it much better than his own drawing, and were pending in the Patent Office with his application. The Norwood structure shown on the left of this drawing No. 3 was a method used in attaching the wires of a sand screen used in the concrete art, and has a diagonal kerf and overhanging spur hammered down over the wire. This antedates the defendant by ten years and fully justifies the Circuit Court of Appeals for the Sixth Circuit in calling it a "common mechanical expedient".

DRAWING No. 4

shows the Hyatt English patent of 1874. This helical coil used to reinforce a concrete column is attached to the spacer by a rivet, which is described in the specification, but not shown in the drawing. This is a stiff structure like Mr. Vandenburgh's.

DRAWING No. 5

shows the Kieserling German patent of 1892. We particularly ask the attention of the Court to this patent, because of the comment upon the evidence of Mr. Cummings above referred to.

It is to be noted that Figure 7c, shown on the right of Drawing No. 5, is the precise form of

structure used by the Truscon Company, defendant in the companion suit in the Sixth Circuit, now before this Court. What the Truscon Company did after putting the rods into the square notches shown in this structure was to peen or swage the notch-edges together, as shown for example in Drawing No. 3 in the Prescott sketch, or the Barnes drawing. This Kieserling structure is fourteen years before the plaintiff's patent.

DRAWING No. 6

shows an *all metal* fence-post, with a method of attaching line wires thereto much like that shown in the Drawing No. 3 as having been used by Mr. Cummings in 1905.

DRAWING No. 7

shows the sand-screen of Prescott and Bennett, and as indicated in the legend thereon "This is the form of attachment used by the Truscon Company". We have had this made on an enlarged scale and in perspective so that the Court may see how much it is like what the plaintiff now asserts is his invention. To turn up the screen on end may constitute invention; but we think not.

DRAWING No. 8

shows another sand-screen, and the structure of the spacing bar shown by Norwood in this is

identical with that used by defendant in this case. This is a very much better illustration of a suitable kerf and spur than that found in the defendant's patent on page 48. It does not, however, secure a helix, but parallel rods.

DRAWING No. 9

shows Clark's metal fence-post with a kerf and spur of different form for attaching the line wires.

Obviously, it is an "Integral securing means," nine years earlier.

DRAWING No. 10

shows the Eason patent kerf and spur, and in the enlarged detail shows *exactly* the construction which is only obscurely indicated in the patent drawing of Mr. Vandenburgh. This is a concrete fence-post; the spacing bar, it is said in Eason's patent, may be of metal; and the kerf and spur is used. The rings which surround the post are used to hold the spacing bar G in position; but it also holds them in position. The wire shown in section in the kerfs is the line-wire, *not* the wire of the rings. Clearly this is an "integral securing means" available to defendant, and it is absurd to suppose that the plaintiff may monopolize it, four years later.

DRAWING No. 11

shows the well known Considere patent. In this the helix is not attached to the vertical rods. All the courts have paid considerable attention to this inventor, as he was one of the first to write upon the art of reinforcing concrete.

DRAWING No. 12

shows two forms of integral attaching means devised by Mr. Cummings, of whose testimony we have spoken; the one on the right is that used by the Electric Welding Company and held not to be an infringement. Date 1905.

DRAWING No. 13

shows the McClure co-pending application. This does not antedate the patent in suit; but it is at least contemporary therewith, and it shows that persons having occasion to attach spacing bars to helixes would "naturally and obviously," in the language of the stipulation, do *just what McClure did, and just what the defendant did,* and just what Norwood and Eason and Barnes and Prescott did. Is that invention?

The fact that this case was co-pending is also conclusive that the Examiner, before whom those cases were at the same time, did not conceive

that the Vandenburgh structure showed the helical coil *used for a column,* except as disclosed in Figure 6; because the Patent Office rules required the Examiner, as we explain page 80, this brief, if he believed the two to interfere, to prepare issues and propose them to the parties for an interference, of which there is no record.

DRAWING No. 14

shows on a larger and more intelligible scale the drawings attached to the Vandenburgh reissue.

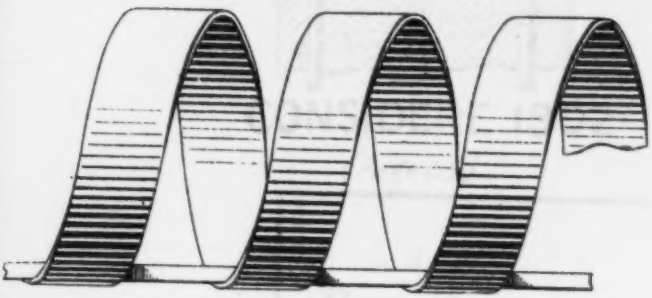
The origin of each figure in each drawing is given adjacent thereto.

DRA

EXAMPLES OF HELICAL COILS IN RE
PRIOR IN DAT

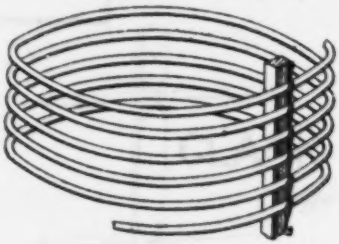
K

HYATT, 1874
(Page 106, Transcript)



B

CONTEMPORARY
McCLURE, 1906
(Page 94 Transcript.)

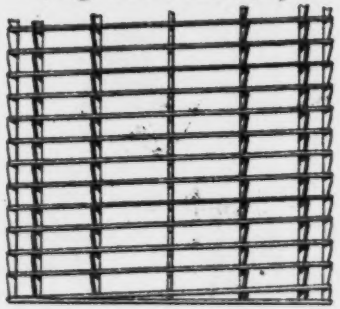


DRAWING NO. I.

COILS IN REINFORCED CONCRETE ART, SHOWN IN RED, IOR IN DATE TO VANDENBURGH

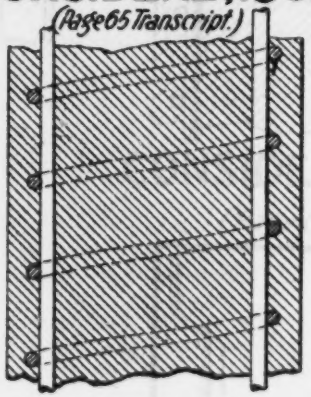
KIESERLING, 1892

(Page 108 Transcript.)



CONSIDERE, 1902

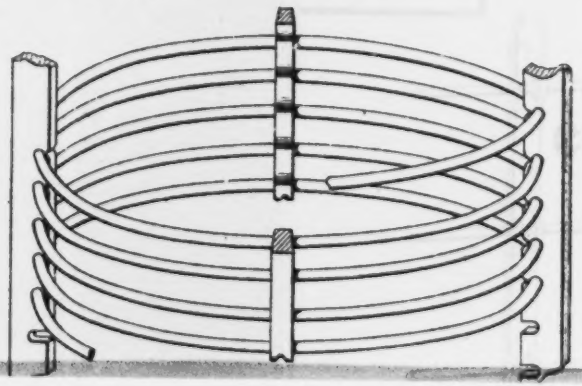
(Page 65 Transcript.)



BOTH METAL-WORKING AND CONCRETE ARTS

PRESCOTT AND BENNETT, 1890

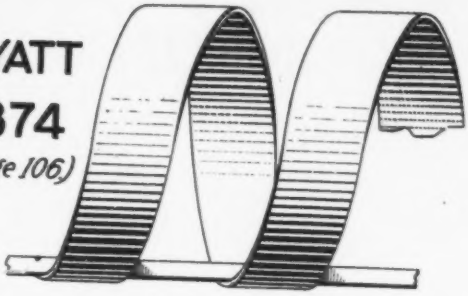
(Page 55, Transcript)

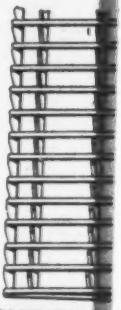


illustrated in patent drawing.

SPACERS USED IN

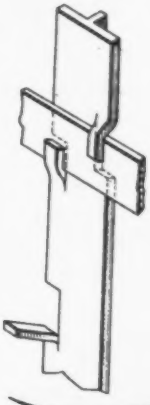
HYATT
1874
(Page 106.)

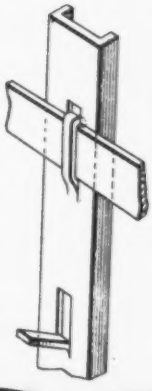




KIESE

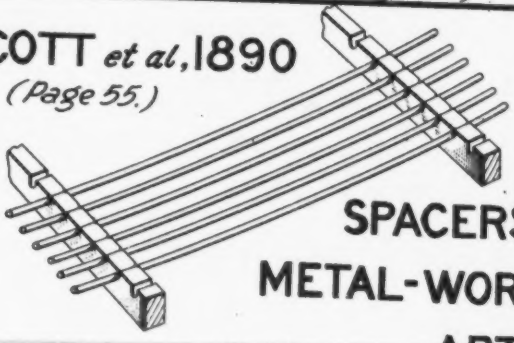
EASON, 1902
(Page 63.)





CUMMINGS, 19
(Page 90.)

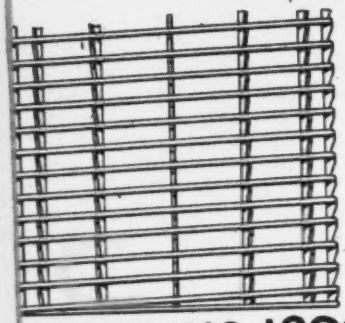
PRESCOTT *et al*, 1890
(Page 55.)



SPACERS IN
METAL-WORKING
ART

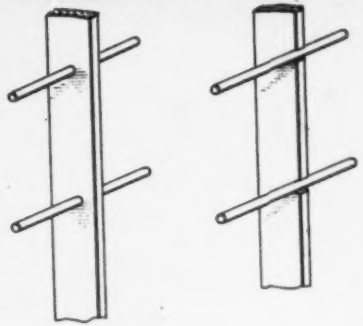
DRAWING NO. 2

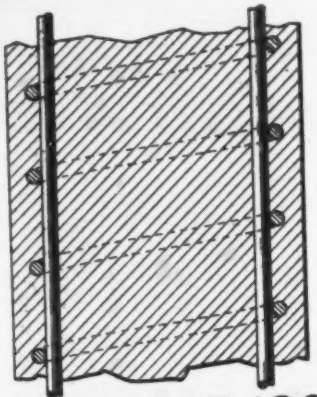
) IN CONCRETE ART, SHOWN IN BLUE



IESERLING 1892

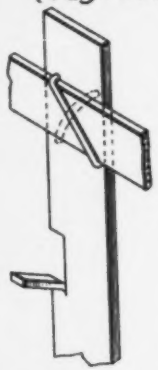
(Page 108.)

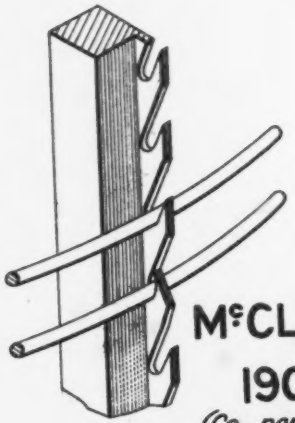




CONSIDERE 1902

(Page 65.)





McCLURE, 1906

(Co-pending.)

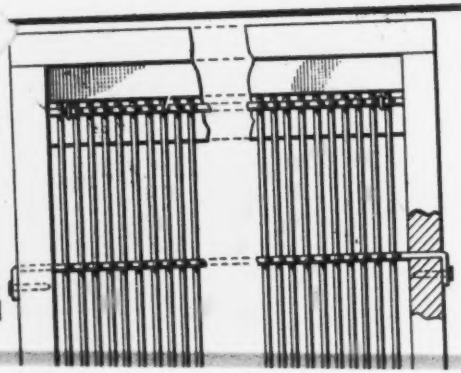
(Page 94.)

CARSON, 1883

(Metal Working Art.)

t al.

Rivet described, but not illustraled in patent drawing.



RS IN

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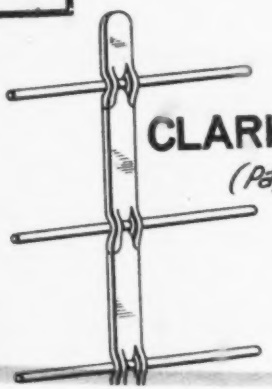
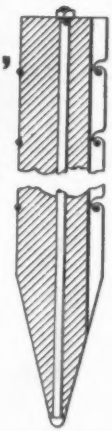


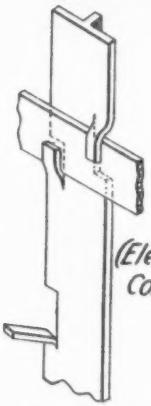
CLARK 1897

(Page 60.)

EXAMPLES OF
IN CONCRETE AND MET
MA

EASON,
1902
(Page 63).



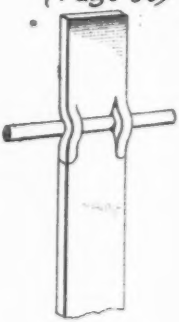


(Electric Welding Company Suit.)

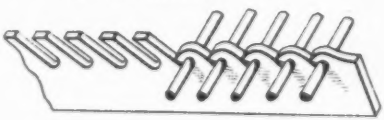
CUMMINGS, I
(Page 90).

KI

CLARK 1897
(Page 60)



NORWOOD, 1896
(Page 57)
Sand Screen



3

SECURING MEANS"

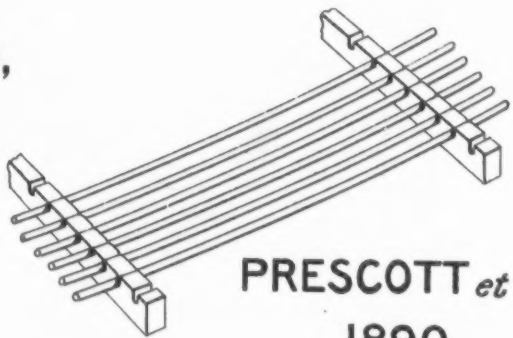
ARTS, SHOWN IN YELLOW.

N USE

CARSON,

1883

(Page 53)



PRESCOTT *et al.*,

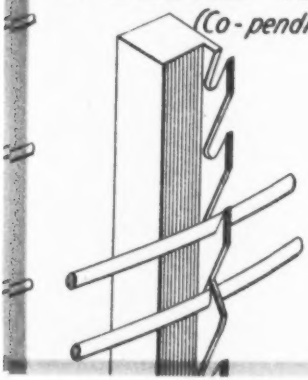
1890

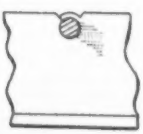
(Page 55).

92

McCLURE 1906

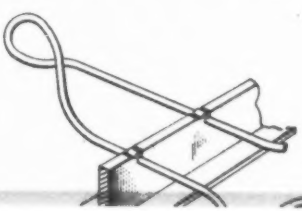
(Co-pending.)





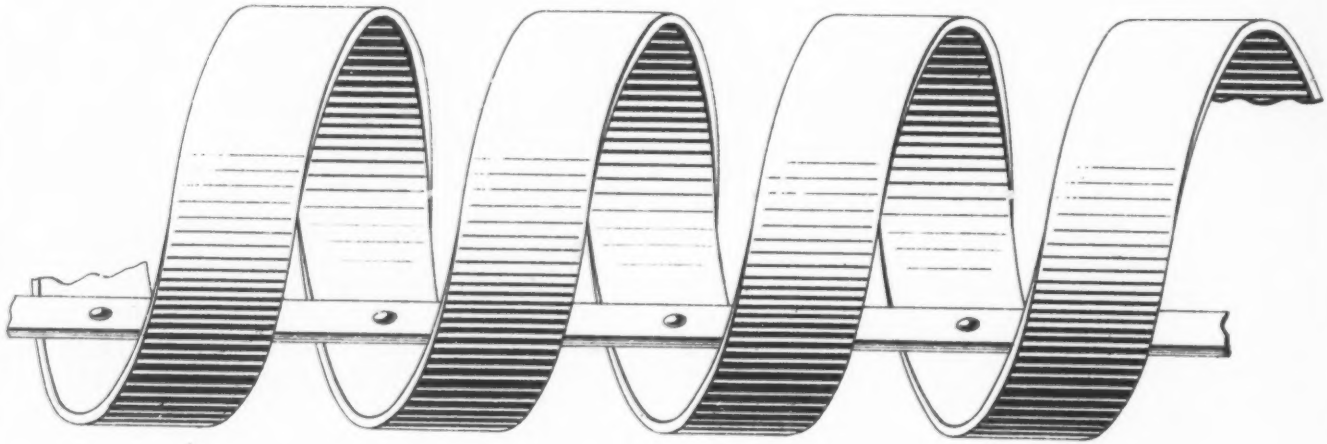
BARNES, 1906

(Page 101, Co-pending)



HYATT 1874

(Page 106)

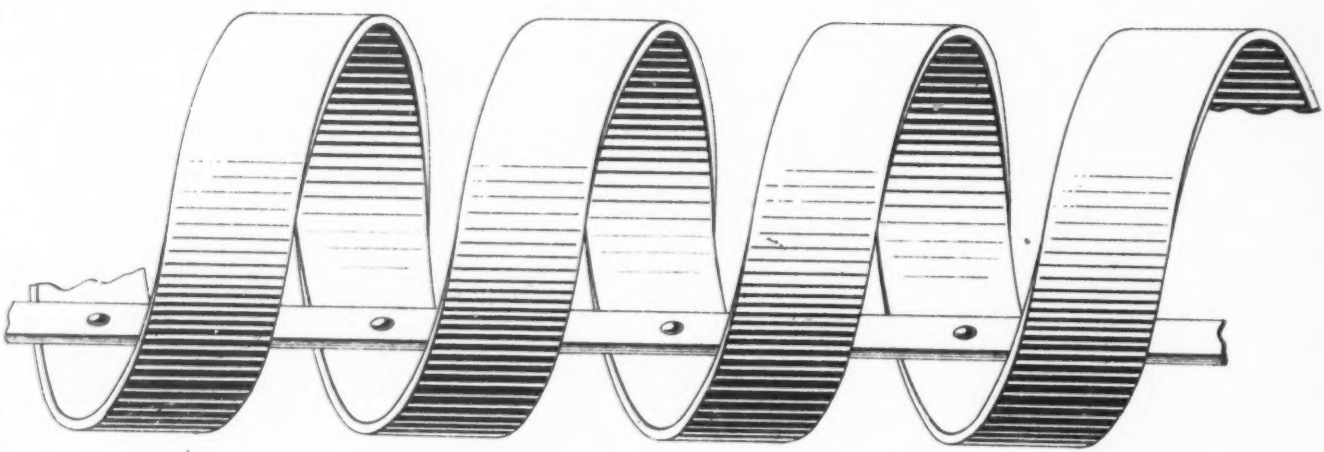


Rivet described, but not
illustrated in patent drawing.

DRAWING NO. 4

HYATT 1874

(Page 106)



Rivet described, but not illustrated in patent drawing.

DRAWING NO. 5

KIESERLING 1892

(Page 108)

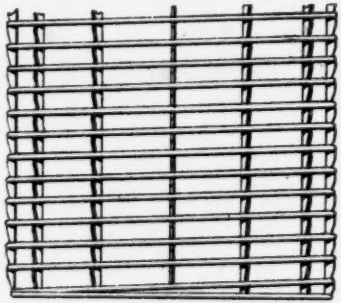
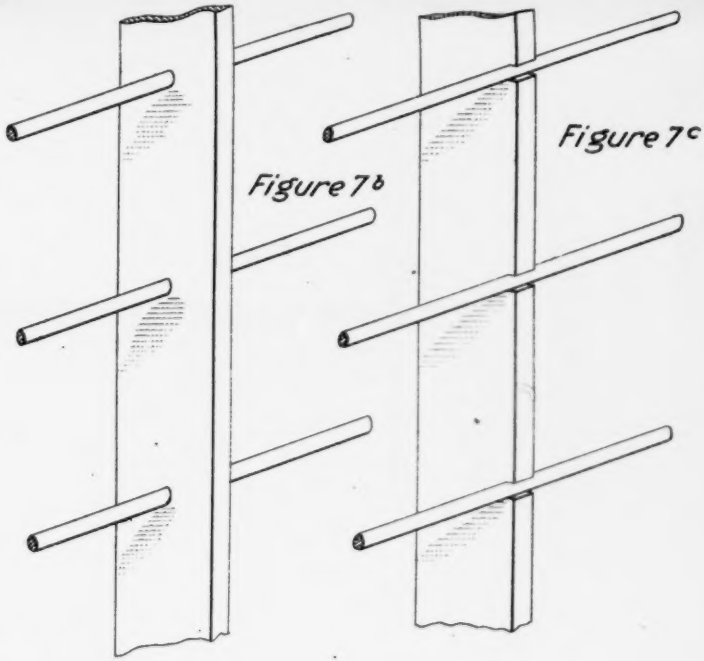


Figure 5.



Figures 5 and 7c show form of reinforcement used by Truscon Steel Company, defendant in the Sixth Circuit: there asserted to infringe.

DRAWING NO. 6

CARSON, 1883

(Page 53)

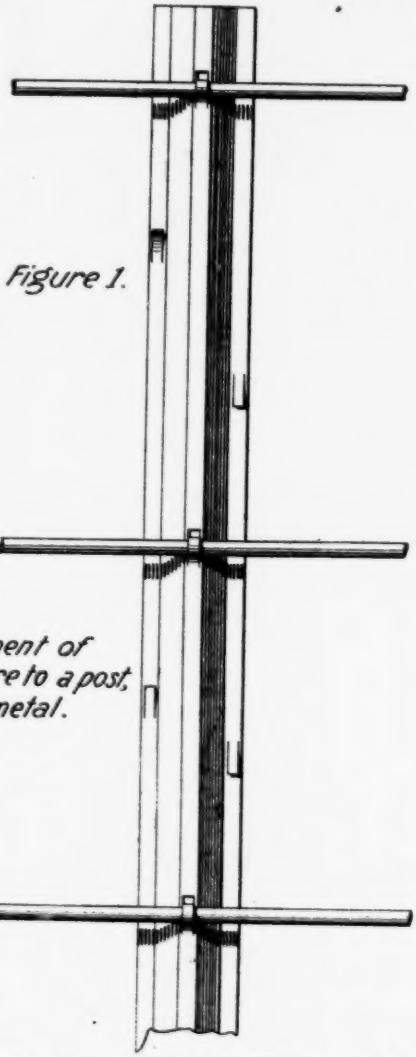


Figure 1.

Attachment of line-wire to a post, all metal.

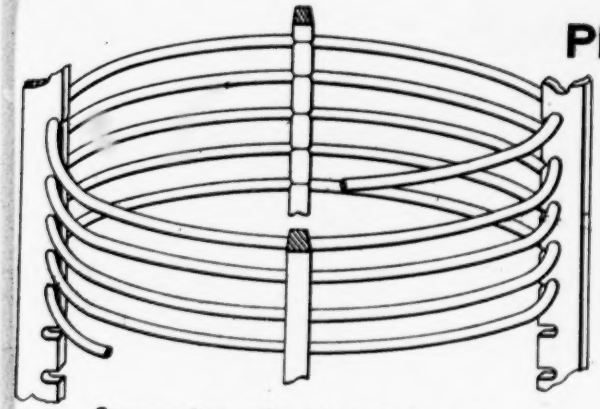
Figure 4.

DRAWING NO. 7

PRESCOTT AND BENNETT, 1890

(Page 55)

SCREEN USED IN PREPARING CONCRETE



Perspective of part of Figure 1.

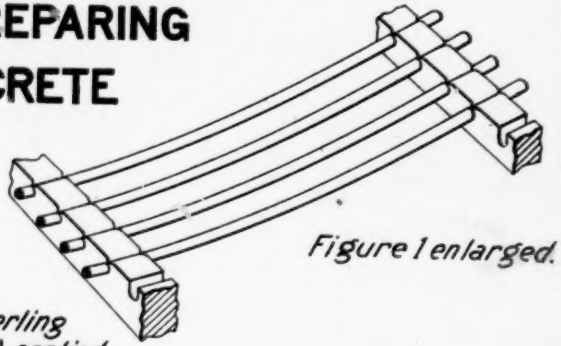


Figure 1 enlarged.

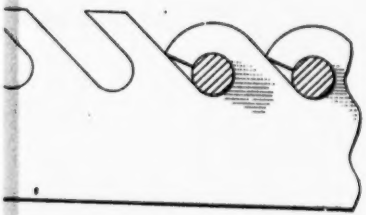
The same structure shown in Kieserling Drawing No. 5 (page 108, Transcript), applied to a hooped concrete column. Also the same as used by the Truscon Steel Company, defendant in the Sixth Circuit, and there asserted by this plaintiff to be an infringement.

DRAWING NO. 8

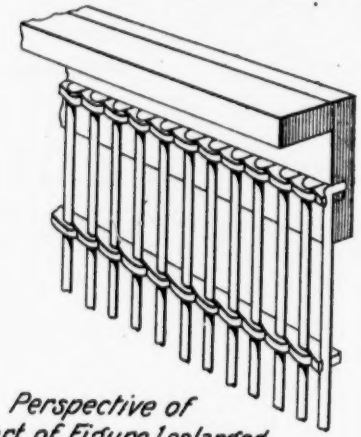
NORWOOD, 1896

(Page 58)

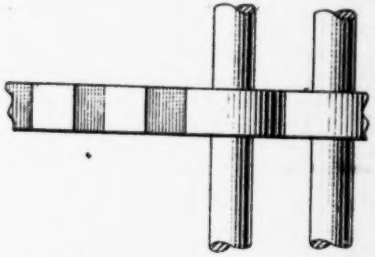
SAND SCREEN USED IN PREPARING CONCRETE



Part of Figure 2 enlarged.
Superior form of attachment
"preferrd" by patentee.



Perspective of
part of Figure 1 enlarged.



Part of Figure 3 enlarged.
Plan of parts shown in Figure 2.

DRAWING NO. 9

CLARK, 1897

(Page 60)

Figure 2.

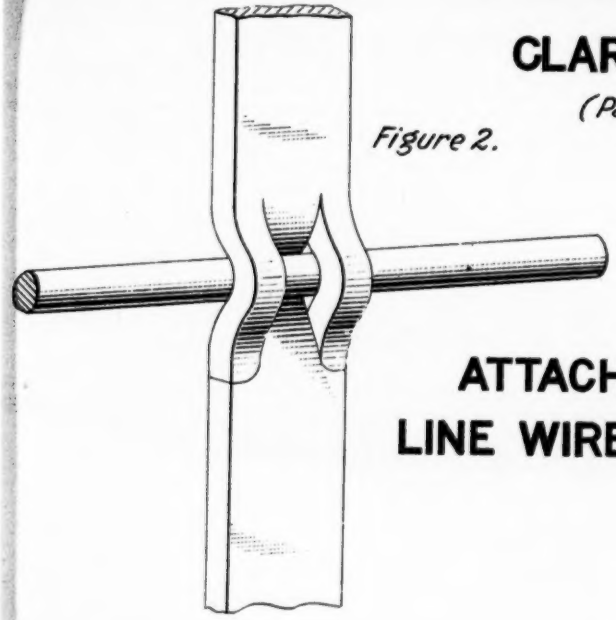
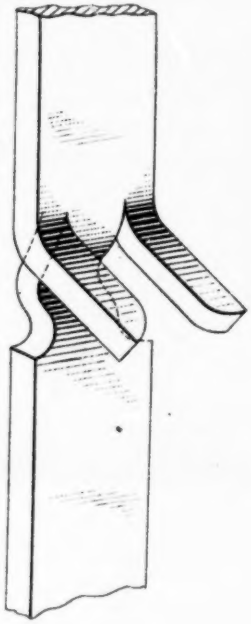


Figure 3.



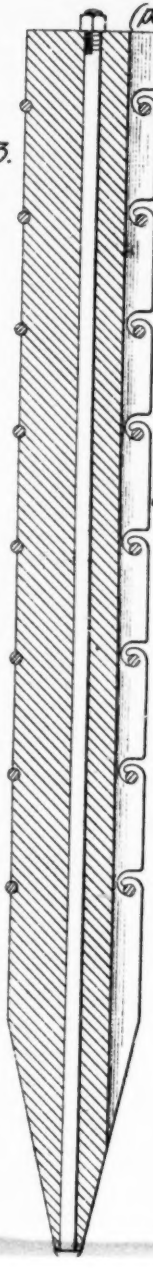
ATTACHMENT OF LINE WIRE TO A POST

DRAWING NO. 10.

EASON PATENT. 1903

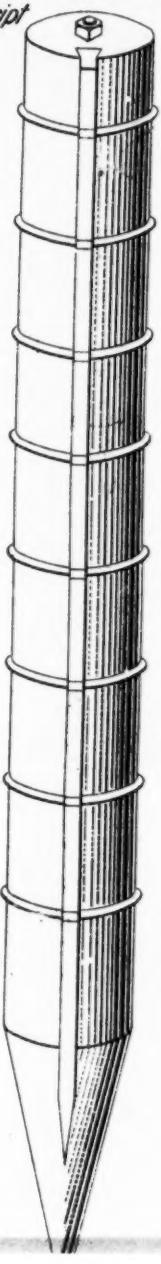
(page 63 transcript concrete fence post.)

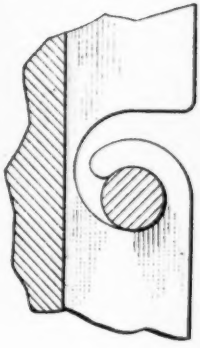
Figure 3.



Independent rings, not a helix.

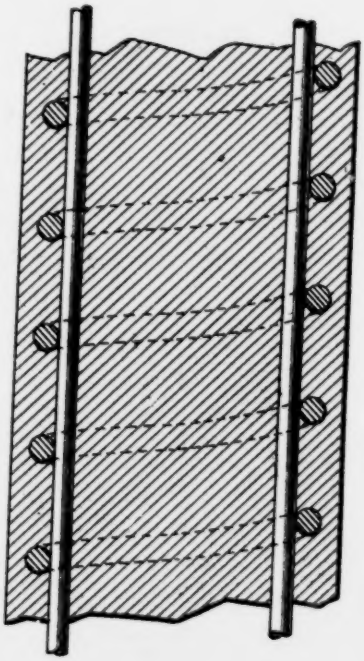
Figure 1.





DRAWING NO. 11.

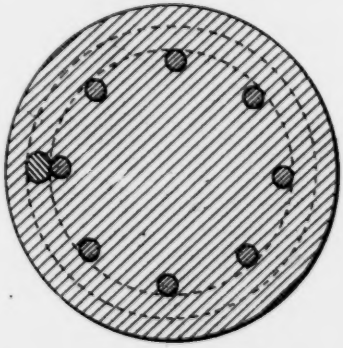
Figure 3.



CONSIDERE, 1902

(Page 91)

Figure 4.

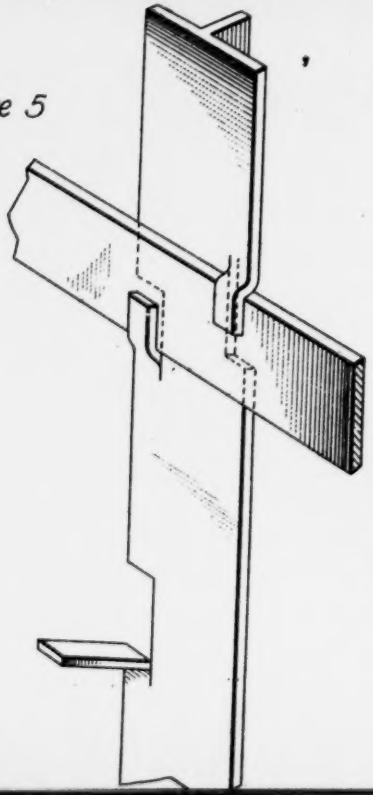


No connection between coils and

DRAWING NO. 12

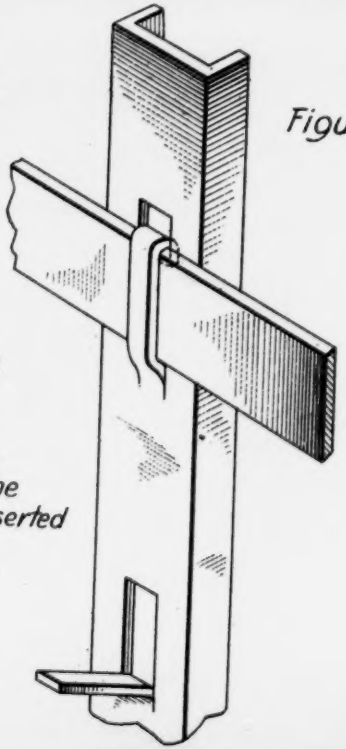
CUMMINGS, 1905

Figure 5



Prior in date to patentee Figure 6 is the form of attachment used by the Electric Welding Company defendant in the suit in the Third Circuit and there asserted by this plaintiff to be an infringement.

Figure 6



DRAWING NO. 13

McCLURE CO-PENDING PATENT, 1906

(Page 95 Transcript)

7 months later in application than Vandenburgh.

Figure 3 (5).

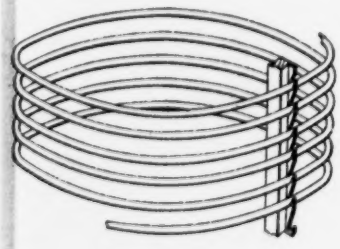


Figure 1.

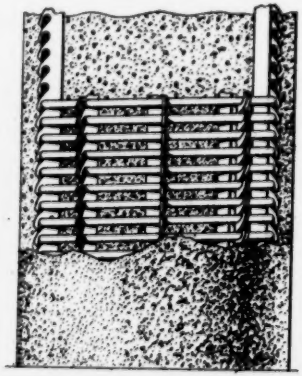
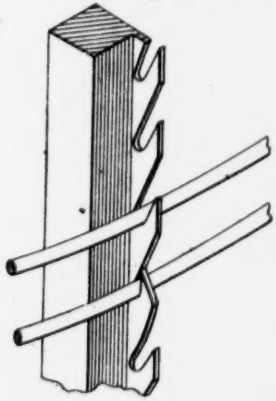


Figure 3.

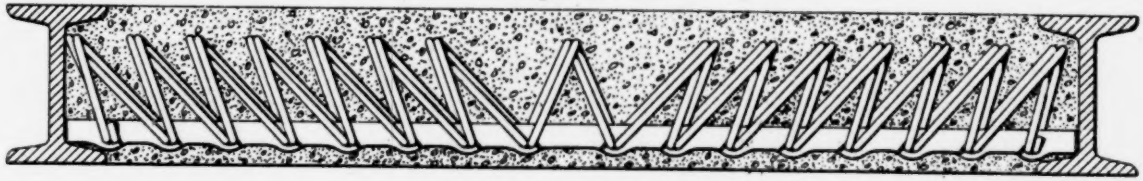


DRAWING NO. 14

VANDENBURGH RE-ISSUE, 1906

(Page 48, Transcript)

Figure 1.



A "TRUSS STRUCTURE"

Patent, page 1 lines 21-55-101.

A "TRUSS STRUCTURE"

Patent, page 1 lines 21-55-101.

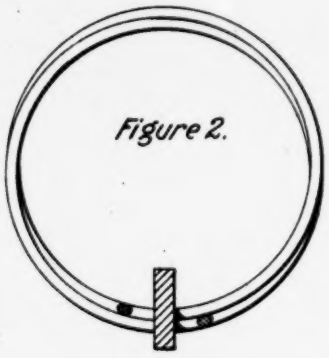
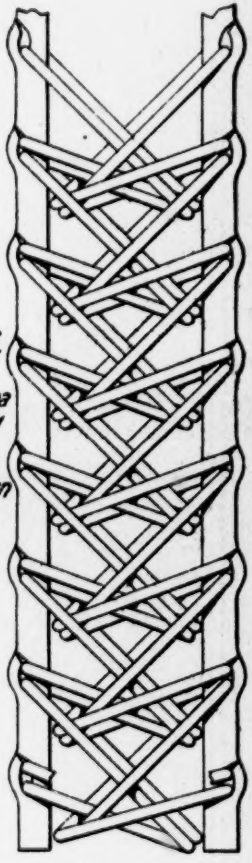


Figure 2.

Figure 3.

Detail perspective of ××× Figure 1.
Patent page 1, line 32.

Figure 6.



Vandenburgh's idea of a column Page 1 of pa.'ent, line 89. The only one shown or described.

Basis of suit. Beam like Figure 3. Patent, page 1, line 70.

Figure 4.

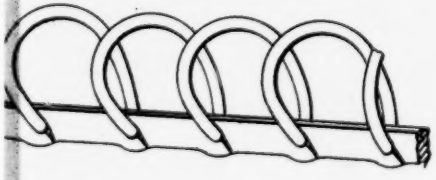
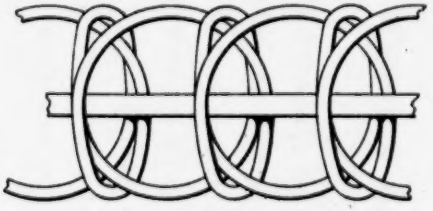


Figure 5.



(Plan of Figure 3)
Patent page 1, line 36.

THE REISSUE DEFENSES.

If the Court shall be of the opinion that the original letters-patent are invalid for direct anticipation; or for want of invention over the prior art; it will not be necessary to consider the following portion of our Brief, which deals solely with the defenses based on the reissue.

The Reissue Defenses.

Practically all of the defenses applicable to a reissue are available in the present case. If the Court believes that the original letters-patent were invalid, then the plaintiff had nothing to surrender, and the reissue will fall with the original.

I. THE REISSUE IS INVALID FOR DELAY IN APPLYING, THE ORIGINAL HAVING ISSUED JANUARY 22, 1907, AND THE APPLICATION FOR REISSUE HAVING BEEN MADE JULY 1, 1916, NINE YEARS AND FIVE MONTHS LATER. AS THIS WAS FOR THE PURPOSE OF BROADENING THE CLAIMS, THE DELAY WAS FAR TOO GREAT.

II. THE REISSUE IS VOID *IN TOTO* FOR LACHES, AS DISTINCT FROM DELAY; LACHES CONSISTING IN FAILURE TO APPLY FOR CORRECTION FOR SEVEN YEARS AFTER THE PLAINTIFF WAS AWARE OF THE ALLEGED DEFECTS IN HIS LETTERS-PATENT, WHICH WERE "INSTANTLY DISCERNIBLE ON OPENING THE LETTERS-PATENT."

III. THE REISSUE IS VOID *IN TOTO* BECAUSE THE OATH ACCOMPANYING THE APPLICATION WAS FALSE, INASMUCH AS IT STATES IMMEDIATE APPLICATION AFTER DISCOVERY OF THE ALLEGED ERRORS:

> "AS SOON AS SAID ERRORS CAME TO HIS KNOWLEDGE AND ATTENTION, HE APPLIED FOR THIS REISSUE"; Transcript, p. 124;

WHICH THE PLAINTIFF CONTRADICTED IN HIS TESTIMONY ON THE STAND, STATING THAT HE KNEW OF THE DEFECTS IN 1909; Transcript, p. 21.

IV. THE REISSUE IS INVALID BECAUSE OF ILLEGAL EXPANSION, MAKING IT FOR A DIFFERENT INVENTION FROM THAT SET OUT IN THE ORIGINAL. ALL THE COURTS WHICH HAVE CONSIDERED THE CASE HAVE SO HELD, AS TO CLAIMS 1 AND 2. CLAIMS 3 AND 5 HAVE BEEN GIVEN THE SAME SCOPE AS THESE VOID CLAIMS.

V. THE REISSUE IS INVALID BECAUSE IT REAPPROPRIATES A CLAIM CANCELLED IN THE PROSECUTION OF THE ORIGINAL CASE; TO WIT, THE THIRD CLAIM, UNDER WHICH DEFENDANTS IN THIS CASE HAVE BEEN HELD. A SUBSTANTIALLY SIMILAR CLAIM WAS *REPEATEDLY* REJECTED IN THE PROSECUTION OF THE ORIGINAL CASE, AND ONLY AFTER CHANGING THE WORD "EDGE" TO "END" WAS THE CLAIM ALLOWED. IN THE REISSUE THE WORD "END" IS CHANGED BACK TO "EDGE", AS IN THE REJECTED CLAIM.

VI. THE PLAINTIFF IS ESTOPPED TO ASSERT THE REISSUE AS AGAINST THIS DEFENDANT, BY REASON OF ITS LACHES IN SUING, AND ITS ACQUIESCENCE IN THE CONSTRUCTION WHICH DEFENDANT PLACED UPON HIS ORIGINAL PATENT, AND ASSERTED TO HIM IN APT TIME.

I.

Regardless of the other parts of the defense based on the acts of the plaintiff in obtaining a reissue, the present reissue is clearly void because of the excessive delay in applying. It was long ago held by this Court that any delay of over two years, in analogy to the statute allowing two years public use, presumptively rendered a reissue improper, and always required explanation; and that a less delay might require explanation under some circumstances, such as an active market for the invention, in which many were concerned, or the like. The leading case, one which has never been disapproved or modified, is

Miller v. *Bridgeport Brass Company*,
104 U. S., 350,

decided in 1881. We quote the following matter from that case:

> "The invention *proved a failure*, but it was found that the use of one of the domes (and the other parts), with the restoration of the chimney, would be a real improvement, and both the complainant and the defendant made such lamps in large quantities. Fifteen years after the original patent was granted, the patentee (or rather his assignee) discovers that the improved lamp was really a part of his original invention, and that by inadvertence and mistake he had omitted to claim it.
>
> • • • • • • •

But there is another grave objection to the validity of the reissued patent in this case. It is manifest on the face of the patent, when compared with the original, that the suggestion of inadvertence and mistake in the specification was a mere pretense; or if not a pretense, the mistake was so obvious as to be instantly discernible on opening the letters-patent, and the right to have it corrected was abandoned and lost by unreasonable delay. The only mistake suggested is, that the claim was not as broad as it might have been. This mistake, if it was a mistake, was apparent upon the first inspection of the patent, and if any correction was desired, it should have been applied for immediately.

These afterthoughts, developed by the subsequent course of improvement, and intended, by an expansion of claims, to sweep into one net all the appliances necessary to monopolize a profitable manufacture, are obnoxious to grave animadversion. The pretense in this case, that there was an inadvertence and oversight which had escaped the notice of the patentee for fifteen years, is too bald for human credence. He simply appealed from the judgment of the office in 1860 to its judgment in 1876; from the Commissioner and Examiners of that date, to the Commissioner and Examiners of this; and upon a matter that was obvious on the first inspection of the patent.

* * * * * * *

And when, if a claim is too narrow—that is, if it does not contain all that the patentee is entitled to—the defect is apparent on the face of the patent, and can be discovered as soon as that document is taken out of

its envelope and opened, there can be no valid excuse for delay in asking to have it corrected. Every independent inventor, every mechanic, every citizen, is affected by such delay, and by the issue of a new patent with a broader and more comprehensive claim. The granting of a reissue for such a purpose, after an unreasonable delay, is clearly an abuse of the power to grant reissues, and may justly be declared illegal and void. It will not do for the patentee *to wait until other inventors have produced new forms* of improvement, and then, *with the new light thus acquired,* under pretense of inadvertence and mistake, apply for such an enlargement of his claim as to make it embrace these new forms. Such a process of expansion carried on indefinitely, without regard to lapse of time, would operate most unjustly against the public, and is totally unauthorized by the law. In such a case, even he who has rights, and sleeps upon them, justly loses them."

If there ever was a case to which this language applied, it is the present one. It is in the record, as we have pointed out in considering the position of the patent in the commercial art, that Mr. Vandenburgh's alleged invention never had any extent of use whatever, and was, in the language of this Court, *a failure;* and only after collapsibility was provided was it possible to sell the so-called spirals and spacers in assembled condition; and it is stipulated that this provision *was made by the defendant.*

Furthermore, it is plain from the face of the patent itself that the structure of Figure 4 upon which the claim of infringement is now based was intended for a beam, and that the only

column which the inventor had in mind at all was *not* like Figure 4. See page 21, this brief. There is nothing in the record to show the use of *defendant's* construction for beams at all; as a matter of fact, it is not available for them. It is available for column hooping, and for nothing else. Under these conditions, the long delay in applying, even if the plaintiff had rights, renders the reissue wholly improper and void. We are here considering the mere question of time, not laches.

II.

But the reissue is also void for laches in applying. We have already quoted from the oath which the inventor filed on July 1, 1916, nine years and five months after he had obtained his letters-patent. The use of the word "rigid" in claims 1 and 2 to characterize the structure was obvious upon "taking the patent out of its envelope." It required only the most ordinary intelligence to appreciate the fact that "rigid" and "permanent" were not the same thing; and indeed, that a structure described as "permanent" was a wholly different thing from one described as "rigid". The Obelisk in New York's Central Park is substantially rigid, and cannot be subjected to deflection without rupture; the great steel towers in New York are permanent, but by no means rigid, as they sway several inches in a windstorm, or curve from morning to noon and night on a hot summer day. Anyone

who pretends to a knowledge of engineering is familiar with these facts, and knows the difference. The inventor is clearly chargeable with laches from the time that his original letters-patent issued up to the time of his application for reissue, since the public, the third party in every patent litigation, was entitled to suppose that he had dedicated to its service the "permanent" fastening which he now seeks to monopolize, if that had been of his invention. We have shown that it was not.

III.

But if this were not so, he is certainly chargeable with notice from the time that this "rigidity" was directly called to his attention. On page 21 of the Transcript, in his own deposition (taken in 1918) in the suit against the Electric Welding Company and introduced here by stipulation, he said:

> "Q. When did you find out that that defect existed in your original patent?"

(The question immediately previous made plain that rigidity was the "defect".)

> "A. *I found out several years ago;* but I never have taken it up in a place where it should be taken up and go ahead with it.
> Q. 30. What do you mean by several years ago? Does that mean two or three? A. Well, I first made a study of it trying to get it on the market after the earthquake in

> San Francisco. I went to Washington, D. C. and got there on the 21st of July, 1906, right after the earthquake. The final patent papers were delivered to me on the 7th of January." (This is a stenographic error; it was the 22nd.)
>
> "Q. 31. Then at that time you discovered that the claims had in them the word 'rigidly'? A. Not at that time—well, no.
>
> Q. 32. When did you discover that? A. In 1909, along about that time.
>
> Q. 33. You then discovered they had in them the word 'rigidly'? A. Yes, I got that from a concrete engineer in looking them over."

And from 1909 to 1916 he made no move to correct the alleged error. "The pretense in this case, that there was an inadvertence and oversight which had escaped the notice of the patentee for fifteen (seven) years, is too bald for human credence."

> *Miller* v. *Bridgeport Brass Company, supra.*

But in spite of that, he asserts in his oath, Transcript, page 122 (124), that

> "With respect to claim 1 that he has claimed as his invention *more* than he had a right to claim as new; that *as soon* as said errors came to his knowledge and attention, he applied for this reissue."

The inventor is an elderly man of no great education, and probably signed whatever was put before him without investigation, possibly

with no adequate comprehension of its meaning. This does not, however, lessen the force of the improper statements contained in the oath, or make that true which on its face, and on his own admission upon the stand, was false when signed, was false when the Patent Office acted on it, and is false now. A reissue obtained by a falsehood (which can hardly be held to be legally unintentional) ought not to stand.

IV.

But the reissue is certainly void because claims 1 and 2 are for an invention different from that of the original and so every court which has dealt with the case has held.

It is not our contention that claims in letters-patent may never be expanded by reissue. It seems just as proper to expand them as to contract them, if that be necessary to express the true meaning of the invention, and does not run into the prior art or interfere with intervening rights. But that is not this case.

Here the plaintiff had letters-patent specifying distinctly a *rigid* connection between the coil and the spacer; a connection of such character that the structure was, in his own language, "*a truss* within the body of concrete." The fact is the use of the one word "truss" ought at once to demonstrate the absurdity of the conclusion reached in this case that a *collapsible* structure could infringe a patent for a "truss", or was an "improvement" upon such a struc-

ture. It is a radically different structure, embodying a different idea of means, and serving utilities entirely outside of the scope of the truss.

Every engineer knows that in the design of a bridge the material is arranged in a series of connected triangles, each pair having a common side, called a "truss," spanning an opening. The triangle is selected because of all the polygons it is the one in which the number of members is least; as a consequence of which, it is impossible to change the shape of a triangle without changing the sizes of its members, which is true of no other geometrical figure. As a secondary consequence and one of ultimate importance in the construction of ironwork, a structure composed of triangles *is stiff, remains stiff, and cannot be deformed without rupture.* This is the characteristic of the bridge "truss," spanning an opening; and naturally enough it occurred to the mind of the competent patent solicitor having Mr. Vandenburgh's application in charge, since what the inventor had devised was a beam for spanning an opening. Naturally enough he used the word "truss," which describes what must be employed to span an opening of any size, as illustrative of the structure intended, since the two were identical.

Now a *collapsible* truss is unthinkable. No sane engineer would provide such a structure, nor is it possible as a fact so to arrange a truss as to make it collapsible without destruction. *If it collapses, it is not a "truss". If it is a "truss" it will not collapse.* If an inventor calls his structure a "truss," he accepts the

conclusion that it is *not* collapsible; and he, accepting claims with an implication of rigidity, and much more with a direct specification of rigidity, accepts also the direct specification and the implication that the structure *cannot collapse,* and that a collapsible structure is *not within the terms of the claim.*

Therefore when he applies for a reissue and alters his claims so that they no longer contain either the direct specification or the implication of rigidity, he has demonstrated beyond a peradventure that he is applying for protection for a different thing from that which was contained in his original letters-patent; and so all the courts have found.

Judge Hough, page 138, Transcript: D. C.

> "Turning to the reissue it is found that claims 1 and 2 originally called for a spiral coil 'rigidly secured' to the reinforcing bar; as reissued the phrase is 'permanently secured'. * * * In result, it is held that the reissue was unlawful as to claims 1 and 2 if 'permanently secured' differs in meaning from 'rigidly secured' because the specification meant 'rigidly secured'; whether this invalidates the reissue need not be discussed."

And further, page 137, Transcript:

> "This is Vandenburgh's invention; he never disclosed collapsibility; what he shows will not collapse."

Judge Orr, Appendix C, page 122: D. C.:

> "The structure of the patent is not collapsible. The quotations above indicate it. If the integral spurs are *forced* down upon the coils and *permanently* retain them in position there can be no collapsibility," (Judicial italics.)

Page 124:

> "• • • Being satisfied that collapsibility was not a feature of the device of the first patent, the Court is equally satisfied that if collapsibility may be found to be disclosed in the reissued patent, then the reissued patent was broader than the original and should not have been granted."

The learned Judge obviously meant that the reissued patent was for a different invention, as was certainly the fact.

Judge Buffington, 263 F. R., 99: C. C. A., Appendix C, page 130:

> "It is quite evident that he (Vandenburgh) was not entitled to the broad claims of the generic type which he secured on the reissue of claims 1 and 2. Kerf and overlapping spurs are not embodied in these claims, and it is manifest that these claims, unrestricted by the limitation of kerfs and spurs, were only added nine years after his patent was granted, to make infringers of those who used other forms of attachment • • • "

Judge Westenhaver, Appendix C, page 133, D. C.:

> "In view of * * * the further fact that all the judges who have heretofore considered and passed on claims 1 and 2 have held them to be invalid because too broad, I shall adopt their conclusion without further statement of my reasons than to say that I fully agree both in the conclusion reached and the reasons given to support it."

Judge Knappen, 277 F. R., 345 (346): C. C. A., Appendix C, page 143:

> "The claims of the original patent, which were replaced by claims 1 and 2 of the reissue, in terms call for a rigid fastening. The omission of the requirement of rigidity in claims 1 and 2 was apparently intended to cover the feature of collapsibility found in later devices. Claim 1 of the reissue is unwarrantably broad."

Judge Hough, page 138, Transcript, says:

> "The evidence makes it plain that this change was made to catch manufacturers like defendant."

Judge Ward, this case, Transcript, p. 151: C. C. A.

> "Both courts (District) held that the original patent did not *contemplate collapsibility* of the structure because the spiral coil was described as *rigidly* fixed by kerfs and spurs on the reinforcing bar. For this reason it

was held that claims 1 and 2 of the reissue which were intended to cover collapsibility of the structure were *invalid* as too broad. We agree in this conclusion."

V.

The reissue is invalid because of the attempt to re-appropriate the third claim, repeatedly rejected while the original application was in the Patent Office. This is one of the claims upon which this defendant has been held; and it is an instructive commentary upon the accuracy of the decision below that this claim has been construed to have *exactly the same scope and meaning as the reissued claims* 1 *and* 2, which were changed to "catch manufacturers like the defendant"; and these were changed, as we will show when we consider estoppel, after correspondence with the defendant had asserted non-infringement of the original letters-patent, and after that view had been *acquiesced* in by surrendering the original letters-patent and having it reissued; and "were intended to cover collapsibility."

We have just quoted what the Circuit Court of Appeals in this case said.

Ordinary attention to the meaning of language deliberately used in a judicial opinion would have made it impossible to hold infringement in this case. The thing that was agreed to was that the "*original patent* did not contemplate collapsibility," and that the claims which were changed to cover *collapsibility* were invalid as

too broad. It was not some special set of words in the patent, but the *whole patent itself*, which "did not contemplate collapsibility." If that was so, how then could some other claim of the patent properly "cover" a collapsible structure?

The Court proceeds:

> "But claim 3 of the reissue is literally the same as claim 3 of the original patent"
> (This statement is untrue, as a comparison of the claims presently to be made will demonstrate)
> "and claim 5 of the reissue is literally the same as claim 4 of the original patent. These claims should be construed consistently with the specifications, which are also literally the same in each patent, as *meaning*"
> (We ask particular attention to the following expression)
> "that the spiral coil *is rigidly connected* with the longitudinal bar at each point of contact. So construed the *claim describes a continuous spiral rigidly and integrally connected with kerfs and spurs in the bar constituting a truss-like structure within the body of the concrete*" etc.

This is the Court's definition of the invention —"a continuous spiral rigidly and integrally connected * * * constituting a truss-like structure." The attempt to cover that by claims 1 and 2 was futile, because they covered collapsibility; and the claims were held to be "too broad". But by what process of reasoning can it be held that *a collapsible structure* is within a claim which must be "construed" as

describing "a continuous spiral *rigidly* • • • *constituting a truss-like structure*"?

The fact is these words are a *reductio ad absurdum* of the holding that a collapsible structure was contemplated or covered by the patent, as all courts have held it was not, and as we think plaintiff has stipulated. The Court defines the invention so as absolutely to exclude the defendant's structure; and then holds that nevertheless the patent is valid, and covers it! It is a perfect example of a *non constat.* Clearly the reissue is void, because of the attempt to appropriate that which had been devised by others since the original letters-patent were issued.

Turning now to the file-wrapper of the original letters-patent (an abstract of which as Defendant's Exhibit B begins on page 115 of the Transcript), we find that when the application was filed on May 9, 1906, it contained the following claim (page 116):

> "3. A reinforcing bar provided upon *one edge* with a series of kerfs and integral spurs, and a spiral coil disposed in said kerfs and retained by said spurs."

This claim was *rejected.*

September 27, 1906 (page 116), the claim was amended into the following form:

> "3. A reinforcing bar provided upon *one edge* with a series of kerfs and integral spurs forming an enclosing wall thereof, and a spiral coil disposed in said kerfs and retained by said spurs."

This was rejected for the second time. On October 30, 1906, this claim was *cancelled*, and the following claim was inserted (see page 47, Transcript, for the text of the original letters-patent as issued):

> "3. A reinforcing bar provided upon *one end* with a series of kerfs each having an integral overlapping spur, and a coil disposed in said kerfs, each convolution thereof being retained beneath one of said spurs."

When the application for reissue was made the change of the word "edge" to "end" was asserted to have been one of the "inadvertences or mistakes" justifying reissue; but this is one of the cases which come under definite rulings of this Court to the contrary. It is not permitted for an inventor to re-assert a cancelled claim, and this Court has ruled that where a claim has once been cancelled there is no remedy; that, if the inventor wishes to contest the point and insist upon the claim, he should appeal, as if it were once cancelled it could no longer be held to be an inadvertence, accident or mistake.

Before citing the cases, however, we point out that the substitution of "end" for "edge" in this particular claim made a wholly new and different combination of it. If the word be "edge", then the extent of the structure would be unimportant; but if the word be "end", then obviously there must be two ends to such a thing as a beam, and while the description in the claim might refer to one "end", there must be another "end" also; and that also must be ar-

ranged, as the patent points out, to make the turns extend in the opposite direction from the first end; in other words, if it be applied to Figure 4, it would be understood that Figure 4 was made *like Figure* 1, with the turns of the coils pointing in opposite directions, as this would be a structure with two "ends". See Scheme of the Patent," page 27, this brief.

In

Leggett v. *Avery,* 101 U. S., 256,

this Court said:

> "It not unfrequently happens that, after an application has been carefully examined and compared with previous inventions, and after the claims which such an examination renders admissible have been settled with the acquiescence of the applicant, he, or his assignee, when the investigation is forgotten and perhaps new officers have been appointed, comes back to the Patent Office and, under the pretense of inadvertence and mistake in the first specification, *gets inserted in the reissued patent all that had been previously rejected.* In this manner, without an appeal, he gets the first decision of the office reversed, steals a march on the public, and on those who before opposed his pretensions (if, indeed, the latter have not been silenced by purchase), and procures a valuable monopoly to which he has not the slightest title. We have more than once expressed our disapprobation of this practice. As before remarked, we consider it extremely doubtful whether a reissued patent can be sustained in any case where it contains

claims that have once been formally disclaimed by the patentee, or rejected with his acquiescence, and he has consented to such a rejection in order to obtain his patent. *Under such circumstances, the rejection of the claim can, in no just sense, be regarded as a matter of inadvertence or mistake.* Even though it was such, the applicant should seem to be estopped from setting it up on an application for a reissue."

This case has been cited with approval in many other decisions in this Court. For example, in

Mahn v. *Harwood,* 112 U. S., 354,

the Court approved of *Legget* v. *Avery* in the following language; and also said later at the end of the majority opinion:

"Thus in *Leggett* v. *Avery,* 101 U. S., 259, the reissued patent embraced a claim which had been presented on the application for the original patent and rejected. It was apparent, therefore, that the omission of that claim in the original was not and could not have been the result of inadvertence, accident or mistake, but was the result of design on the part of the Commissioner and acquiescence on the part of the patentee; and so far as that claim was concerned the reissued patent was properly held to be void."

* * * * * * *

"The specification is very plain and free from complexity and, as we have already stated, the claims in the original patent

were clear and explicit. There was no ambiguity and nothing to prevent the patentee from seeing, at once, on inspecting his patent, whether his whole invention was claimed or not. *We can see no possible excuse and none has been attempted to be shown, for allowing the patent to stand the length of time it did without any attempt to have it amended.* The reissue was made against law apparent on its face, and nothing is shown in the record to remove this illegality. The case is clearly within the principle laid down in *Miller* v. *Brass Co.*, and the patent must be regarded as void so far as the new and expanded claims are concerned."

See also similar language in

Shephard v. *Kerrigan*, 116 U. S., 593;
Corbin v. *Eagle Lock Co.*, 150 U. S. 38.

VI.

Estoppel.

Even if all this were not so; even if the reissue were a reasonable one obtained in apt time and correcting what are really legal errors subject to the statute, yet it is not proper or reasonable to enforce it in this case against this defendant, by reason of the estoppel from intervening rights, as set out in the correspondence found in Defendant's Exhibit D, beginning on page 125, Transcript.

The gist of this is that plaintiff, learning that the defendants were making column hooping in substantial quantities and asserting that this was an infringement of his letters-patent, wrote to the defendant representing that it infringed. Defendant took up the matter with its counsel, Mr. Varney, and after study of the patent replied through Mr. Varney that it did not infringe, its view being expressed on page 128 as follows:

> "It would seem to me" (defendant's president) "that the patent would be limited to the combination of a spiral *attached rigidly* to a reinforcing bar.
>
> The spirals which we manufacture are made by a combination of coils of wire attached to an angle, which is slotted on one leg. The spiral is *not rigidly attached,* as it is made collapsible. The angle or spacer is used simply to stiffen the spiral until it is embedded in concrete. In other words the angle is simply a mechanical device used to hold the spiral in place until the concrete is poured. The angle, however, is not figured as a reinforcing bar and the metal used in the angle does not enter into the figured stresses of the column."

This letter was written May 23, 1916; the correspondence was a flat repudiation of the claim of infringement upon the very ground that the original letters-patent *covered a stiff structure,* and that what defendant made was *collapsible.*

Later, a copy of Plaintiff's Exhibit 7, Transcript, page 52, was sent to the defendant, who referred it to its attorney (see page 130) saying:

"You will note he shows a column collapsed and also shows a spiral column in which a T section is used for a spacer. This apparently would *not be in accordance with the patent,* which calls for a reinforcing bar with the spiral rigidly attached. The T spacer is used simply as a spacer and a stiffener", etc.

Later defendant's president learned that the patent had been reissued, and again consulted counsel, in November, 1916; and on January 9, 1917, received a further notice of infringement of the reissued letters-patent, the application for reissue of which had been hastily prepared *immediately after this correspondence,* which terminated in June, 1916; the application being filed on July 1st, and sworn to on the 24th of June, twelve days after the termination of this correspondence: allowing for five or six days in mail transit to San Francisco, about one week after. The application left San Francisco for Washington within a few days of the receipt of defendant's letter.

Under this state of facts, how can it be maintained that the plaintiff is not estopped to assert a construction of his reissued patent different from that put upon the original? If the two claims 3 and 5 bore the interpretation which the Court of Appeals has put upon them in the original patent, why did he not come back at once to defendant and say that it was *mistaken,* and submit his difference of opinion to the court? If he had sued upon his original letters-patent and had asserted of it, as he asserts of it now, that it covered the defendant's structure,

then a fair issue would have been drawn and if defendant lost, it should pay; but to omit to sue then and to sneak back to the Patent Office with the two fraudulent claims Nos. 1 and 2 designed "to catch manufacturers like the defendant" (which every court considering them has held to be void for the fraud) is a competent admission that the view of the defendant was correct. The surrender of the original letters-patent with the lying oath was an acquiescence which this Court should not permit him to set aside.

There is a clear estoppel *in pais.*

Is Not the Whole Reissue Void for Fraud and Perjury?

In general, it is unjust to an inventor to deprive him of that which he has actually invented because of any mere error of procedure. But this is not such a case. Here the plaintiff, knowing that a great industry had arisen without help from him, which repudiated his claim of infringement, pointing out that he had for many years had the patent containing the assertion of rigidity, while what manufacturers made was collapsible, goes back to the Patent Office with the deliberate falsehood that he had not intended to restrict himself to rigidity; and the additional falsehood that he had asked for the reissue "as soon" as he found that his original letters-patent did not cover what he was now asserting it covered; and obtains *ex parte,* within six weeks of its filing, a changed docu-

ment covering what had never theretofore been claimed. Every tribunal which has passed upon it has held that the claims 1 and 2 so obtained, for the purpose of covering a collapsible coil, were void because not for the plaintiff's invention as described in the original letters-patent.

Under much less provocative circumstances in two different cases, the Circuit Court of Appeals for the Seventh Circuit has held that the jurisdictional requisites of an application for reissue were not present, as there was no inadvertence, accident or mistake, and therefore *the whole reissue* (including original claims) was void. The two cases are

General Electric Company v. *Richmond Railway Company,* 178 F. R., 84

and

McDowell v. *Ideal Concrete Machine Co.,* 187 F. R., 815.

The Circuit Court of Appeals in this present case relied on an expression of this Court in

Gage v. *Herring,* 106 U. S., 640,

which it interpreted to mean that claims of an original patent brought forward into a reissue might not be invalid, although the new claims of the reissue were.

It is only necessary to point out that no statement to the effect indicated was made in *Gage* v. *Herring.* What the Court there said was:

> "The new claim in the reissue being invalid and, the defendants not having infringed the entire combination set forth in the repetition of the old claims, the decree below can neither be upheld upon the new claim, nor modified so as to apply to the other claim, but must be reversed and the case remanded with directions to dismiss the bill."

So also in

Mahn v. *Harwood,* 112 U. S., 354,

the Court said:

> "As this leaves only the fourth claim to be considered, and as it is clear from the evidence in the case that the appellant did not infringe that claim, the decree of the Circuit Court must be affirmed."

Yet this Court has never seen in these cases the doctrine announced by the Circuit Court of Appeals in this; because in

Eby v. *King,* 158 U. S., 366,

this Court referred to *Gage* v. *Herring* in a case in which it held that the reissue was void *as a whole.* This is more important because the patent in that case was reissued under the old form of Section 4916, on which the original letters-patent were cancelled on surrender whether the reissue was granted or not; a situation remedied by the clause since introduced into the statute rendering the surrender effective only upon

the actual grant of the reissue. Obviously, this Court under those conditions would do all that it could to save to the inventor any claims contained in his reissue which were found in his original patent, in the absence of fraud or misrepresentation; yet in that case, the whole reissue was declared void.

We think that under circumstances where there is no fraud, no misrepresentation, no attempt to blackmail manufacturers by claims which cover what they are doing when the original did not, but only a *bona fide* attempt to cover what the inventor believed himself to have invented, claims brought forward into a reissue from an original patent should be sustained if that is reasonable; but they should not be given an interpretation which is *identical with the natural meaning of broad claims* in the same document, which are held by the Court to be invalid because not for the same invention as the original letters-patent.

That is what the Circuit Court of Appeals has done in the instant case; and this although the inventor lied when he went to the Patent Office, and falsely represented that he had just ascertained that his patent was too narrow; and although this lie was told for the purpose of dominating the present defendant's structure by new claims, after the plaintiff by his application for reissue had acquiesced in the defendant's contention that it did not infringe the claims of the original patent.

It may be noted that the specification of the original and that of the reissue are identical, *verbatim et literatim.* There was therefore no inadvertence, accident or mistake in the description of the invention; as the drawings are also identical, though on a reduced scale, it is plain there was no mistake there.

The oath to the reissue application (Transcript, page 122) is extremely confused in its use of the word "specification"; at one place making it both the specification, technically so-called, and the claims, and in another place distinguishing between the two; and not a word of excuse for nine years of delay is given. But it is clear that when both the description and drawings in the reissue and original are *identical,* there is but little support for the statement that there was any misapprehension on the part of the counsel preparing the claims. The language of this Court in

Eby v. *King,,* 158 U. S., 366

("Under the rulings of this Court, it is clear that this reissue *cannot be* supported. Not only was there *no claim of a defective or insufficient specification,* none that the patentee had claimed as his own invention *more than he had a right to claim as new,* none of inadvertence, accident, or mistake, but, four years after the original patent was issued, the patentee attempts to secure a reissue, with claims broadened for the purpose of covering that which is presumed to have been once abandoned to the public. *All that has ever been said by this Court in restraint of the practice of reissuing pat-*

> *ents applies with full force to this case. White* vs. *Dunbar,* 119 U. S., 47, 7 Sup. Ct. 72; *Ives* v. *Sargent,* 119 U. S., 652, 7 Sup. Ct, 436; *Dunham* vs. *Manufacturing Co.,* 154 U. S., 103, 14 Sup. Ct. 986,")

applies very definitely to the present case, which seems to us to be clearly one in which the whole reissue should be held invalid on account of fraud and misrepresentation to the Patent Office, and on account of a fraudulent attempt to dominate that which had been devised by others without assistance from the plaintiff's patent; to dominate and appropriate

> "a construction independently worked out by this defendant and particularly without any knowledge of plaintiff's patent or of plaintiff's alleged invention and as a natural and obvious means of securing the spiral to the longitudinal."

(Transcript, page 133.) That is the plaintiff's own stipulation, which ought to put him out of court at once.

INFRINGEMENT.

If the Court shall be of opinion that the original letters patent were invalid for anticipation; or for want of invention in view of the prior art; or that any of the defenses based upon the reissue should be sustained; or that the plaintiff is estopped to assert against this defendant the construction of its patent now insisted upon; then it is unnecessary for it to consider this part of our Brief, which deals solely with infringement.

Infringement.

I. CLAIMS DECLARED INFRINGED ARE NOS. 3 AND 5.

NO INFRINGEMENT BECAUSE VANDENBURGH STRUCTURE IS RIGID AND DEFENDANT'S IS COLLAPSIBLE.

II. VANDENBURGH (CLAIM 5) SLANTS HIS KERFS IN OPPOSITE DIRECTIONS FROM CENTER OF BAR, TO OPPOSE STRAINS. DEFENDANT'S KERFS ARE ALL IN SAME DIRECTION.

What we say about infringement is inevitably bound up with the scope to be accorded to the patent, in connection with the interpretation which the Court must put upon it in view of the prior art; and in view of the conduct of the case in the Patent Office; and in view of the difference between the original letters-patent and the reissue; and in view of the interpretation put upon the claims in the opinion of the Circuit Court of Appeals and its failure to see that the interpretation which it put on claims 3 and 5 gave them the same meaning which it held rendered claims 1 and 2 invalid.

It seems elementary that a patent claim can have, so far as one suit and one structure is concerned, but *one* interpretation. It is not, as once was pointed out by this Court, a "nose of wax" which can be twisted to mean one thing in one part of the case, and something else in another. If the claim has a broad interpretation, then anything within that scope which antedates the inventor is a sufficient invalidating reference. If, on the contrary, it has a narrower interpretation, then while those matters might not inticipate they are still relevant as showing a want of invention; and have an important bearing upon the question if infringement, which is rendered much more difficult of proof.

The fact is that Mr. Vandenburgh never at any time either invented or disclosed what is now known in the art as "column hooping". Therefore, *we use nothing he devised.* While his case was pending in the Patent Office, the patent to McClure, page 94, Transcript, was also there pending; and the patent to Barnes, page 100, Transcript, was filed about five weeks before that of Mr. Vandenburgh. McClure shows *the modern form of column hooping,* which has gone into extensive use; and he, and not Vandenburgh, might have made claims covering that structure, if it had been new. He was satisfied with restricted claims of a rather peculiar character. Barnes does not show, strictly, column hooping; but he does show a column reinforce with *the same form of kerf and spur* as Vandenburgh.

For many years before these applications were filed, it had been a rule of the Patent Office,* that where two or more inventors disclose the same structure, which in the opinion of the Examiner is patentable, the Primary Examiner would formulate claims which can be made by all of the parties, and would suggest these claims to the parties for an interference. This course has been followed in hundreds of cases; and literally thousands of claims have been suggested by the experts of the Patent Office to settle the question of priority of invention. It is instructive that in the present case the McClure patent, the Barnes patent, and the Van-

* "96. Whenever the claims of two or more applications differ in phraseology, but relate to substantially the same patentable subject-matter, the examiner, when one of the applications is ready for allowance, shall suggest to the parties such claims as are necessary to cover the common invention in substantially the same language."

denburgh patent, were all *co-pending* applications, and that the Examiner, the recognized official expert in this art, did not see that there was any interference between them. He suggested no claims to McClure and Vandenburgh; because, while McClure showed and claimed column hooping, Vandenburgh did not. He suggested no claims to Barnes and Vandenburgh to cover the alleged invention of the kerf and spur disclosed by both of them; because obviously he regarded that as *not an invention at all*, and certainly not one which either of those applicants was entitled to monopolize.

So far as the interpretation of the patent along the line of infringement is concerned therefore, it must be conceded, we believe, that Vandenburgh never showed or disclosed to the art column hooping at all; and certainly did not disclose to it a collapsible structure which could be shipped economically. Furthermore, he has stipulated that the structure which the defendant sells was made without knowledge of his patent, was devised by the defendant itself, and was the *"natural and obvious"* way of connecting the coil to the spacer.*

See also the "Scheme of the Patent," found on page 27 of this brief.

In order to bring before the Court exactly what it is that the plaintiff has claimed, we here copy the claims in suit: Transcript, page 50, Reissued patent;

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*We can see no reason why this uncontradicted stipulation is not a complete defense. If this was the "natural and obvious" way of doing things it follows as of course that it was without invention; because that is based on something which is *not* "obvious". Certainly there can be no injustice in holding the plaintiff to his own stipulation.

"1. A concrete reinforcing consisting of a bar *having a plurality of integral spurs*, and a spiral coil *permanently* secured thereto by having the spurs bent down on the several coils, the coils extending beyond and *free of the bar* at the opposite side therefrom to the securing point.

2. A concrete reinforcing consisting of a bar *having integral means* to secure a coil thereto, and a spiral coil *permanently* secured to the bar in each convolution and extended beyond and *free of said bar* at the opposite side therefrom to the securing point.

3. A reinforcing-bar provided upon one *edge* with a series of kerfs each having an integral overlapping spur, and a coil disposed in said kerfs, each convolution thereof being retained beneath one of said spurs.

5. A reinforcing-bar provided upon one edge with a series of kerfs disposed diagonally to the length of the bar each having an overlapping integral spur *projected toward the center of the bar*, and a coil disposed in said kerfs and retained beneath said spurs."

We waste little time on claims 1 and 2. Six courts and twelve judges have declared that they were fraudulently obtained for a different invention from that set out in the original patent. Five courts and nine judges have held that the original claims containing the word "rigid" correctly described *the device* of Mr. Vandenburgh, and only the opinion in this case holds to the contrary by implication only (by a complete *non constat*), after a direct statement restricting him to rigidity.

It has never been contended that the defendant in this case made anything coming within the terms of these two void claims, if they are to be interpreted as covering only a rigid structure. If therefore the Court shall be of opinion that all these courts and judges were right, that will be the end of the case on the question of infringement of claims 1 and 2.

This Court cannot accept without examination the decision of any other court on a matter which is submitted to it; therefore we compare here (very briefly) the claims in suit with their prototypes in the original letters-patent.

Original, page 47.	Reissue, page 50.
"1. In a reinforcing-bar, a spiral coil *rigidly* secured thereto at two points in each convolution thereof and extended beyond and *free of said bar at the opposite side therefrom* to the securing point.	"1. A concrete reinforcing consisting of a bar *having a plurality of integral spurs,* and a spiral coil *permanently* secured thereto by having the spurs bent down on the several coils, the coils extending beyond and *free of the bar at the opposite side therefrom* to the securing point.
2. In a reinforcing-bar, a spiral coil *rigidly* secured thereto at two points in each convolution thereof and extended beyond and free of said bar at the opposite side therefrom to the securing point, *said coils being deflect-*	2. A concrete reinforcing consisting of a bar *having integral means* to secure a coil thereto, and a spiral coil *permanently* secured to the bar in each convolution and extended beyond and *free of said bar* at the op-

Original, page 47.	Reissue, page 50.
ed in opposite directions from the center of the bar toward the ends thereof.	posite side therefrom to the securing point.
3. A reinforcing-bar provided upon *one end* with a series of kerfs each having an integral overlapping spur, and a coil disposed in said kerfs, each convolution thereof being retained beneath one of said spurs.	3. A reinforcing-bar provided upon *one edge* with a series of kerfs each having an integral overlapping spur, and a coil disposed in said kerfs, each convolution thereof being retained beneath one of said spurs.
4. A reinforcing-bar provided upon one edge with a series of kerfs disposed diagonally to the length of the bar each having an overlapping integral spur *projected toward the center of the bar,* and a coil disposed in said kerfs and retained beneath said spurs."	5. A reinforcing-bar provided upon one edge with a series of kerfs disposed diagonally to the length of the bar each having an overlapping integral spur *projected toward the center of the bar,* and a coil disposed in said kerfs and retained beneath said spurs."

The difference in the language of the claims is manifest, as is the difference in scope and meaning. That they cover different inventions we think cannot be gainsaid. For example, take claim 1 of the reissue. Here the attempt is made to dominate *all forms* of integral connection between the helix and the spacer by the phrase "a bar having a plurality of integral spurs." No such statement is made in the original, which says only that the so-called

spiral coil shall be "rigidly secured" to the bar at two points in each convolution thereof. Both the original and the reissue claims contain the phrase "extending beyond and free of the bar at the opposite side therefrom to the securing point," the meaning of which has never been adjudicated. It must mean, we believe, that the coil is "free" from attachment *to anything* at the side opposite the bar; it is true that it says "free of the bar"; but the same bar *could not* be attached to the coil at opposite ends of a diameter. If the coil is "free," then the addition of the second spacer would put the construction outside of the claim, because with that the coil is not "free," but is *secured* on opposite ends of each diameter.

So also with claim 2, which is wholly unlike anything found in the original; the very broad phrase is used, "a bar having *integral means* to secure a coil thereto," and the same expression regarding the coil is used. Obviously, the same considerations apply here. No such scope could be given to the original claim 2, which contains the requirement of rigidity, and also that the coils should be "deflected in opposite directions from the center." The very broad expression "integral means" is not contained in the original letters-patent; and the "integral spur" (on page 1, line 78), is only named as a "preferred" means. This will be sufficient, we believe, to justify the Court in upholding the decisions of the various courts below, which are unanimous to the effect that claims 1 and 2 of the reissue are void because of their being for different inventions from those disclosed in the original.

As to claim 3. This is a re-insertion in the reissue of the original *cancelled* claim 3. The original *cancelled* claim as found on page 116, Transcript, is:

> "3. A reinforcing bar *provided upon one edge* with a series of kerfs and integral spurs, and a spiral coil disposed in said kerfs and retained by said spurs,"

Claim 3 of the reissue, as found on page 50, Transcript:

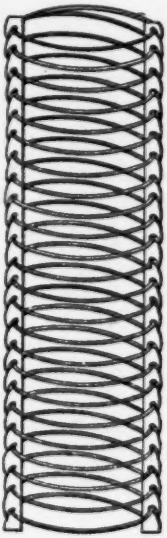
> "3. A reinforcing bar *provided upon one edge* with a series of kerfs each having an integral overlapping spur, and a coil disposed in said kerfs, each convolution thereof being retained beneath one of said spurs."

How can it be contended that these are not the same thing? It is juggling with words to hold that they are different. In view of the specification and in view of the drawings, they are the same.

But claim 3 must be interpreted to mean, according to the entire disclosure, *a stiff structure*, as our Court of Appeals held in this case. It will be noted that Figure 4, the only thing on which the charge of infringement is based, is for a *part only* of the ironwork arranged as in Figure 1. In other words, the complete view of Figure 4 is as below; while nothing in Mr. Vandenburg's original patent or his reissue asserts or suggests that Figure 4 is like the "collapsible spiral" of defendant, shown in Plaintiff's Exhibit No. 5, page 51, in which the coil and spurs extend in the same direction from one end of the structure to the other, as in the contrasting sketch here shown.

Figure 4, Complete.
"Overlapping integral spurs projecting toward the center of the bar." Claim 5.

Defendant's spurs all project in same direction.



Structure

Indeed, we may quote the language of Judge Hough in his opinion, page 135:

> "That this is not the exact thing Vandenburgh invented is too plain for argument; the assertion is that a wire spiral fastened to one piece of metal, such as defendant's 'spacer', in the manner commercially used by defendant, and intended as an aid to concrete building, embodies the claims in suit; the addition of another spacer is immaterial

and collapsibility is a function or attribute of what the claims define."

While this is a much better statement of plaintiff's argument than any he has made, is it not "too plain for argument" that the structure which the defendant makes is *not* the structure of the Vandenburgh patent, by whatever formula of words the latter may be defined? As a question of *things*, and not of words describing them, Judge Hough's opinion is unanswerable.

The Circuit Court of Appeals attached importance to the asserted fact that this claim was contained in the original, saying that it was "literally" the same. That is not true, but whether contained in the original or not, it is plain that it was intended to describe and embody a *rigid structure*, which the defendant does not use; for the Court said (Transcript, page 151):

> "*These claims* (3 and 5) should be construed consistently with the specifications, which are also literally the same in each patent, as *meaning that the spiral coil is rigidly connected* with the longitudinal bar at each point of contact. So construed the claim describes a continuous spiral *rigidly and integrally connected with kerfs and spurs in the bar constituting a truss-like structure within the body of the concrete.*"

It appears to us entirely obvious that the defendant does not use anything which responds to this language, and that the finding of infringement by a collapsible structure, even by calling that an "improvement", is erroneous, under every principle of construction.

Turning now to claim 5, it must stand or fall with the other claims so far as validity is con-

cerned; but it stands on a different basis as to infringement. No court which has considered it has paid attention to its exact language. This describes the connecting spur as "an overlapping integral spur *projected towards the center of the bar.*"

What does that language mean? Unless the defendant's overlapping integral spurs "project toward the center of the bar," whatever that may mean, it is clear it does not infringe. No explanation is given of the phrase in the specification, which is the same in the two patents; but the drawings render plain beyond a peradventure what the language is intended to describe. By consulting Figure 1 of either patent, page 45 or 48, it will be seen that the overlapping kerf lettered 9 (on the left-hand side at the bottom) does as a fact "project toward the center of the bar" shown in Figure 1; and the same may be said of the similar spurs on the right-hand side of the drawing,* and in all the figures.

If that is what he meant, that is, that the spurs 9 "project toward the center" of the reinforcing bar shown as an integer in Figure 1, the structure of the defendant does not do that, since all of its spurs project *in the same direction* from one end of the column to the other. (See the cuts on page 87, this brief.) Equally of course, if Figure 4 does not have that construction, it would *not* be "a detail perspective of the * * * coils shown in Figure 1" as Figure

*There are reference characters 8, 8 given on the drawing for these spurs in Figures 1, 3 and 6; but these are not mentioned in the specification, and we do not know what they designate

3 is asserted to be on page 1 of the patent, line 34, Transcript, page 49; nor would it be "a similar view" (to Figure 3) "of a modified form using one coil" as Figure 4 is there said to be.

But the words must have some meaning. It is a primary rule of construction that every word must be assigned a meaning; and it is clearly applicable to letters-patent of absolute necessity, so that a restriction in one claim may differentiate that claim from others which do not contain it. Therefore, unless the words are to be stricken from claim 5, they must be assigned a meaning. This seems to be the only one which can be given to them.

Summary Upon Infringement.

THEREFORE WE SAY THAT THE DEFENDANTS DO NOT INFRINGE CLAIMS 1 AND 2, BECAUSE THOSE CLAIMS ARE VOID, AND WERE INTENDED, AS OUR OWN CIRCUIT COURT OF APPEALS HAS SAID, TO COVER A COLLAPSIBLE STRUCTURE, WHICH THE PATENTEE DID NOT DISCLOSE; IT DOES NOT INFRINGE CLAIM 3 BECAUSE THAT COVERS A RIGID STRUCTURE ONLY, AS THE WHOLE SCOPE AND TENOR OF THE ORIGINAL PATENT SHOWS, AND AS THE DISTRICT COURT AND COURT OF APPEALS HAVE HELD; IT DOES NOT INFRINGE CLAIM 5 BECAUSE THAT ALSO, CORRECTLY CONSTRUED, COVERS ONLY A RIGID STRUCTURE (AS THE COURT OF APPEALS HELD), AND DIFFERS FROM THE OTHERS BY INCLUDING THE REQUIREMENT THAT THE SPURS SHALL "PROJECT TOWARD THE CENTER OF THE BAR"; WHICH IS NOT THE CASE WITH THE COLUMN HOOPING MADE BY THE DEFENDANT.

ACCOUNTING.

If the Court holds the original letters-patent invalid; or sustains any of the "reissue" defenses; or sustains Judge Hough's conclusion that defendant does not infringe; then it may dispense with reading this section of our Brief, which deals only with the accounting.

Accounting.

Our complaint upon the accounting is that the courts below and the Master have failed to follow the leading decision of this Court,

Westinghouse v. *Wagner*, 225 U. S., 604,

in important particulars.

That case dealt with the doctrine of apportionment of ascertained profits; and laid down several fundamental propositions which may be summarized (not in the language of the Court) as follows:

(1) It must be proved that there have been profits derived from the use of the invention set out in the letters-patent.

(2) If the entire thing which is made or sold is not new, then the plaintiff, or in certain alternatives the defendant, must apportion the ascertained profits into the parts due to the letters-patent and those due to the rest of the structure.

(3) This duty falls primarily *upon the plaintiff*; but if he fails through the inherent impossibility of so apportioning; or fails so to apportion *after proper and adequate effort* so to do; or fails so to apportion by reason of the confusion of accounts *due to some act of the defendant*, then (and then only) the duty falls upon the defendant to make the apportionment; and if he fails, then the total profits are awarded to the plaintiff.

(4) But these profits (either total or apportioned) may be *abated* by another apportionment, for the first time recognized in that decision; that is, between the patented structure as described or conceived by the plaintiff and embodied in the letters-patent, and any improvement which may have been added by the defendant to that structure. In this form of apportionment, the burden is *still upon the plaintiff*, after the defendant has shown that he has made improvements; and if he is unable to apportion by reason *of the act of the defendant*, then the defendant may assume the burden; and if he fails the whole amount of profit will be awarded. But if plaintiff makes *no attempt* to apportion, he fails to sustain the burden of proof, defendant has no duty, and plaintiff gets only nominal damages.

The limiting words used in the synopses of the Court's holdings must be borne in mind. It is not enough that the plaintiff *does not* make the apportionment; he must make proper and adequate effort so to do, and must fail in his effort either because of the act of the defendant, or because of the inherent impossibility of making it, in either of the two kinds of apportionment. Therefore, if a defendant does everything in his power to facilitate the taking of the account, and furnishes every item of information asked for, he has done all that can be required; if the plaintiff then fails, he is entitled only to a nominal recovery.

These principles the Court and the Master have declined to follow. It is sufficient, we believe, to justify a reversal to read the Master's

report, beginning at page 316 of the Transcript, where the Master says:

> "It was the duty of the plaintiff to apportion the profits between those due to the patented feature and those attributable to the unpatented part, or to show that such apportionment is impossible *by reason of the defendant's acts.*
>
> The plaintiff has *made no effort* to work out an apportionment or to show that one was difficult or impossible • • • In connection with a claim for reasonable royalty, the plaintiff has introduced estimates by experts as to the comparative cost of the two methods, showing a large saving by the Vandenburgh method. But these estimates give no basis for an apportionment for the reason that it does not appear what, if any, part of this saving *went to the defendant*" • • •

Mr. White, one of plaintiff's experts, says that *he does not know* who makes the profit, the manufacturer or the contractor.

> "So far as making any apportionment of the profits between the patented and unpatented features is concerned, *the plaintiff has wholly failed to sustain the burden of making such apportionment.*"

Then the Master proceeds to say that having failed to sustain the burden of making the apportionment (indeed he might have stated with correctness, from the evidence before him, pages 162-276 of the Transcript, that the plaintiff had proceeded throughout on the assumption that it was not necessary to prove anything except that

the defendant had made profits), the whole of defendant's profits from the sale of the iron-work containing the alleged infringement was due to the patented construction.

There is not a letter of proof of this in the entire record; the Court will see, from what we have said concerning the commercial use of the actual structure shown in the letters-patent (page 15 this brief) that *no such evidence could be given.* The plaintiff had on the stand, Mr. White, a practical contractor, page 42, and Professor Thayer of Pittsburgh, whom it called as an expert witness, page 58. Neither of these witnesses was asked any question concerning the commercial utility of the Vandenburgh structure, *as outlined in the letters patent.* Neither of them expressed any opinion as to the relative salability of the thing shown in the letters-patent and that made by the defendant. Neither of them attempted to differentiate between the price obtained for the mere iron, without assembly (which obviously could not be influenced by the letters-patent), and that when the iron was assembled in the manner set out in that document. The letters-patent being pure paper and subject to all of its infirmities, are no better than the other similar documents in the record; the comparison is then to be made between the structure shown in the letters-patent, and those shown in others. Every element of the combination shown in the Vandenburgh patent, as interpreted by the Court below, is old and well known, and the assembly of them gave no advantages not equally present in other structures. The statements of Mr. White and the entire fail-

are to contradict them by any evidence on the part of the plaintiff, that *he did not know who* made the profit, if any were made, from the method of assembling; and *did not know* whether the contractor or the defendant manufacturer made the profit from his fanciful figures, are sufficient to show that no profit whatever was gained *from the letters-patent in suit;* certainly that nothing definite is proved.

On the other hand, it is conceded in the stipulation that the controlling advantage of collapsibility (Transcript, page 133) was derived from

> "a construction independently worked out *by this defendant* and particularly without any knowledge of plaintiff's patent or of plaintiff's alleged invention and as a natural and obvious means of securing the spiral to the longitudinal."

There is no evidence in the record (we ask the Court's attention to the difficulty in which the defendant is placed by the fact that it is compelled to say again and again that there is "nothing in the record" on certain points; omissions of proofs are difficult to deal with; it is easy to designate a positive statement, but an entire absence of testimony can only be mentioned) that the rigid or "truss" structure shown in the letters-patent was ever made, used or sold by anybody anywhere; and indeed, the plaintiff has persistently tried to shift its ground in this particular from *what is shown* in the letters-patent to *some other* structure which included collapsibility, although our Court of Appeals has distinctly held that the patent

"did not cover collapsibility." Transcript, page 151:

> "Both Courts held that the original patent did not contemplate collapsibility of the structure * * * for this reason it was held that claims 1 and 2 of the reissue which were intended to cover collapsibility of the structure were invalid as too broad. We agree in this conclusion."

For example, on page 172 of the Transcript, a witness was asked by plaintiff's counsel:

> "Q. 38. You understand what is the subject matter of this case, do you not, *collapsible* spirals? A. Yes, sir, spirals."

And the interrogation proceeded as if collapsibility was *necessarily involved* in the plaintiff's structure, although the ruling of every court which has dealt with that subject is to the contrary, and although the claims which were said to cover collapsibility were held to be *void for that reason* as "too broad".

There is also an entire failure to make the second kind of apportionment between the structure made under the letters-patent, and the improvement which it is stipulated the defendant made (assuming it to use that structure) by making it collapsibile. Of the absurdity of saying that making one structure collapsible is an "improvement" on making another one stiff we have already spoken.

His Honor Judge Mayer(in the second opinion of the Court of Appeals, Transcript, p.

398) was under the misapprehension that because some of the ironwork was not sold *assembled,* collapsibility was not shown to be a requisite of salability; but his Honor failed to realize that the structure is *even more completely collapsed* when sold in that way, since the wire is simply tied in a compact coil, and the longitudinals are wired together and shipped with it, in a separate bundle. Of course, this is "collapsed," even more than when the wire and longitudinals are assembled and then the turns of the wire laid flat.

It is apparent without expert reasoning that if the structure be a stiff cylinder, say, a foot in diameter and fifteen feet long, it takes up a great deal more room and will cost more to ship than if it be in a flat bundle fifteen feet long, one foot wide and three inches thick. It should not need expert deposition to show that this was of the utmost importance and indeed one of the plaintiff's witnesses, Mr. Cummings, Transcript, page 27, has said:

> "Q. 18. The possibility of collapsing the spirals is of considerable advantage in shipping, is it not? A. In shipping, yes."

Yet no attempt was made to show the difference in salability between a structure which could not be collapsed; as shown by plaintiff, and one which could, as made by defendant.

It seems clear that both the Master and the court below failed to appreciate the *right* of defendant to have the accounting proceeded with according to the lines laid down by this Court

in *Westinghouse* v. *Wagner*. The Master has found,

> "The defendant has shown in the proceedings before me no disposition to cause unreasonable delay or in any way harass or impede the plaintiff."

And as the Court will see from the whole of the accounting, defendant has done everything it could to simplify and expedite the case and has made repeated response to calls for information which the plaintiff made, even though they were not ordered by the Master and perhaps might have been resisted.

It was imperative for plaintiff to apportion, then, *first*, between the profit from the sale of the ironwork and the profit from the sale of the same amount of ironwork assembled according to the letters-patent, as compared with assembly by any of the methods shown in the prior art; and *second*, between the profit due to the "rigid" assembly according to the plaintiff's method, and the collapsible assembly invented by the defendant. The Master has found repeatedly that *no attempt* has been made to do any of this; and his conclusion that all of the profit it is due to the patented improvement, so-called, is without competent evidence to sustain it. Allowing for all of the inferences and deductions which can properly be made from what plaintiff has shown, and disregarding anything which the defendant has put into the case, at the close of the plaintiff's case defendant was entitled to a ruling that the plaintiff

had failed to make out a case; because he had failed to show that profits were derived from the sale of the *patented* structure; had failed to show what part of the profits was due to the letters-patent, as apportioned between the iron-work and the assembly; had failed to apportion between the profits due to the patented "rigid" structure, and the collapsible structure of defendant. Plaintiff was entitled only to nominal damages, and must pay (according to *Dobson* v. *Dornan,* 118 U. S., 10), the costs of the inquiry before the Master, including the Master's fee.

Error is also to be found in Judge Mayer's method of determining when all the profit is to be attributed to plaintiff's patent; he says (page 402):

> "The test is whether the invention of the patent in suit gives the whole value to the infringing device. Obviously, it must, in a case where a sale * * * would be impossible without availing of the disclosure of the patent, and, where the additional feature had no relation to the structure, *qua* structure, or to its shipment as such" etc.

We are not sure what that means; *no witness has testified* that a "sale * * * would be impossible" unless infringing. But the test proposed is useless; for *this Court has prescribed another.* In the *Westinghouse case,* the sale would have been "impossible" except for the infringement; yet this Court ordered the case to go back for apportionment between the infringing article, and the added improvement.

Of course, where no sale has ever been made of the structure *without* the improvement of col-

lapsibility, as in this case, Judge Mayer's test fails completely. It is impossible to say that a change which makes a "rigid" structure collapsible is not made in a "structure, *qua* structure." In view of the definition of the invention in the former opinion of the Circuit Court of Appeals which includes rigidity as an element, Transcript, page 151, folio 452, Judge Mayer's analytical mind no doubt had great difficulty in reaching *any* conclusion.

We believe ourselves to be entitled to a reversal of the decree below on the accounting questions alone.

Damages.

The Master allowed no damages, holding that none from loss of sales was proved (page 322, Transcript; "There are no damages from lost sales or reduction in price.") He also held that no reasonable royalty was deducible from the evidence, it being in hopeless conflict; one witness saying $12 per ton, another $8, and other proof showing at most a few cents. No other conclusion is possible. See page 325, Transcript.

A little fuller discussion of some features of the accounting, with citations of decisions, will be found in Appendix D, page 150.

The Law.

A surprising amount of attention has been paid by the courts to the art of reinforcing con-

crete with ironwork designed to strengthen the angles and joints. Forty-eight cases are reported in the lower courts, not counting the decisions on the patent in suit (See list in Appendix B), twenty-five being District Court cases and twenty-three being appeals to the various Circuit Courts of Appeals. Only one case has heretofore reached this Court, so far as we have found; that is

Bone v. *Marion County*, 251 U. S., 134;

the opinion in which was written by Mr. Justice McKenna.

Out of all these contests, the plaintiff succeeded in three cases. In all others, the patent was declared to be void, or else not infringed. One of these successes was neutralized by the decision in the Bone case, a prior decision of the Circuit Court of Appeals for the Sixth Circuit sustaining the patent.

Of the six cases upon the patent in suit, three in the District Courts and three upon appeal, only the appeal in this case has sustained the patent or found infringement.

Therefore it will be seen that the art has been very fully developed and thoroughly thrashed out judicially, the general weight of adjudication being substantially to the effect that the various combinations and improvements patented were either not inventions at all, on account of anticipation or lack of invention, or were of such restricted and specific character that they were not infringed.

One instructive case was *Berger* v. *Trussed Concrete Steel Company* (the predecessor in business of the Truscon Steel Company, respondent in the other case now here on *certiorari*): the decision in the court below was by Mr. Justice Clarke, at that time a District Judge. The case is reported in 257 Fed. Rep., 741 in the Sixth Circuit Court of Appeals, and was decided in October of 1918. Its language is so pertinent to the case now before the Court that we append it. Indeed, we might well enough base the decision of this case upon the two cases now referred to, that is, the *Berger* case in the Sixth Circuit, and *Bone* v. *Marion County* in this Court; the scope of patents in the concrete art must be conceded to be restricted within narrow limits, at least *prima facie*. The decision in the *Berger* case is as follows:

> *Berger Mfg. Co.* v. *Trussed Concrete Steel Co.*, 257 Fed. Rep., 741, 10-10-1918.
>
> W F. GUTHRIE, for defendant.
>
> "It must be conceded that the complete combination specified in the claim is not precisely anticipated, that it possessed commercial utility, that it has gone into considerable use, and—more important than all—that metallic studs or supports and metal lath had been used in combination for a number of years and fastened together in different ways without adoption by anyone of the specific methods of fastening here disclosed. These considerations make strong-

ly in favor of patentability; but we are compelled to think that they are not sufficient to overcome the conclusions necessarily resulting from the state of the art.

It is clear that sheet metal supports in the form of studding or furring had been used to carry perforate metal lathing long before Caldwell's alleged invention. The two had been fastened together by separate wire fastenings and by several other different methods. It is clear, also, from the record that it was *a common expedient* to attach things to be carried by a sheet metal support to that support by cutting out and striking up a prong from the support and then bending it back over the part carried. The record shows that this expedient had been used under a great variety of conditions. One of the older instances of such use of this attachment was to make the fastening between a tubular sheet metal fence post and the supported fence wire. To use this same method of fastening to carry one or two strands of a metal lathing, instead of to carry one fence wire, we think cannot be considered to involve invention. It is as if common wooden lath had always been attached to wooden studding by screws, and some-one observed that to nail them on as fence-boards are nailed to a fence-post made a quicker and better method of fastening. The fact that Caldwell used a support with a flat surface, and thereby got a little better binding effect on both sides of his prong than when the surface was round, cannot turn the scale in favor of the patentee's contention.

The principles involved and the controlling conditions are so familiar and their application is *so wholly a matter of judg-*

ment that it seems unnecessary to go into the question more fully.

The decree is affirmed".

This case, like the one at bar, was on a *reinforcing metal* structure; *not* a reinforced concrete structure, like the *Bone* case, *infra.*

Bone v. *Marion County,* 251 U. S., 134, covered the reinforcing of a concrete retaining wall at the base in such a way as to form a heel upon which the weight of the material to be retained would rest, so that the resultant thrust tending to overturn the wall was counterbalanced; and the reinforcing was arranged to strengthen the joint between the upright wall and the heel which went under the earthwork. The Court's decision is very fully illustrated on pages 137, 141 and 145 of the report. In that case, the Circuit Court of Appeals for the Sixth Circuit had sustained the patent upon a record which did not show very fully what the prior art was; but the Circuit Court of Appeals for the Seventh Circuit reached a different conclusion and held that the patent was invalid on the ground that

> "Bone was not the first to do the things that he asserted he was the first to do, and that whatever the record in the Sixth Circuit might have shown, so far as the record before this Court was concerned the absolute converse of that proposition had been demonstrated".

The Sixth Circuit Court held that

> "It is also in evidence that there has been a large sale and general acquiescence in the Bone patent".

Under these circumstances, this Court took up *de novo* the whole subject, discussed the prior art and held the patent to be "a step, not a leap" in the progress of the art; and commenting (see p. 144 of the opinion) upon the prior art, said:

> "To execute theories by adequate instrumentalities may indeed be invention, but an answer to petitioner's contention we have given by our comment on the • • • publications and the fullness of their expositions. *Bone may have been ignorant of them and his device may not have been their suggestion.* They seem to have been unknown to American engineers, not even the interest of the controversy in the Sixth Circuit having developed their existence. From this local ignorance nothing can be deduced favorable to the patent".

And the Court held that these foreign publications, though wholly unknown and uncirculated here, nevertheless were within the terms of the statute and therefore deprived the Bone structure, if not entirely of novelty, at least of any substantial scope.

That is a close analogy to the case now before the Court, though there is an important difference which makes in favor of the present defendant. That is that the prior art publications and the prior patents, all in English, all in our own country, except the Hyatt English patent and the Kieserling German patent, were fully in evidence in this case, and constitute practically the same record as that upon which the Sixth Circuit Court of Appeals declared this

patent to be invalid; and that after a full discussion and consideration, which they did not have in the case at bar, though in the record and presented to the Court.

Justice Story a hundred years ago, in

Earle v. *Sawyer,* 4 Mason 1, F. C., 4247

characterized the course of reasoning to be applied in patent cases (and which unfortunately is not always applied) as follows:

> "It did not appear to me at the trial, and does not appear to me now, that this mode of reasoning upon the metaphysical nature or the abstract definition, of an invention, can justly be applied to cases under the Patent Act. That Act proceeds upon the *language of common sense and common life,* and has nothing mysterious or equivocal in it".

Bearing this in mind, we think it cannot but be held that the present so-called invention was but the selection from the common expedients of the ironworking mechanic, and then assembling the parts in the relation in which they had theretofore been used; so that to it applied the language of this Court in

Hollister v. *Benedict Co.,* 113 U. S., 59,

where Mr. Justice Matthews said (p. 73):

> "It is but the display of the expected skill of the calling, and involves only the exercise of the ordinary faculties of reason-

> ing upon the materials supplied by a special knowledge and the facility of manipulation which results from its habitual and intelligent practice; and is in no sense the creative work of that inventive faculty which it is the purpose of the Consititution and the patent laws to encourage and reward".

Or to use the language of Professor Robinson in his well-known work on the patent law (Section 78):

> "The mental faculties employed in the inventive act are the *creative,* not the *imitative* faculties. An invention is the product of original thought. It involves the spontaneous conception of some idea not previously present to the mind of the inventor. Industry in exploiting the discoveries and acquiring the ideas of others; wise judgment in selecting and combining them; mechanical skill in applying them to practical results; none of these are creation, none of these enter into the inventive act".

The application of the principles thus laid down to the case before the Court is too apparent to need extended explication. We have only to refer to the drawings which we have prepared for the Court to see at once that there is *nothing of novelty* in any part whatever of the so-called "invention"; that it is a selection of well-known things, each acting in precisely the way in which it has acted before; that each part of the group is applied to precisely the same situation as that from which it was taken; that *no new result whatever* is obtained by the

so-called combination of the various parts of the alleged "invention".

Indeed, we may go further, and by referring to the other letters-patent found in the record, show that not even the restricted idea which the Examiner was willing to allow (see page 27 of this brief, "Scheme of Patent") had any incident of novelty. Even the very tilting of the coils away from the center, the bringing of the strain upon them in opposite directions so that they balanced one another, was *not new;* see Pohlmann, page 71, Transcript; Kahn, page 74; Peabody, page 78; Golding; page 81; Maxwell, page 97. Drawing No. 1 shows that the helix or so-called "spiral" coil was thirty years old before this patentee saw its utility; that the longitudinal or spacer was old in many relations is shown clearly by Drawing No. 2; that *many forms* of "integral attaching means" for the coil and the longitudinal, including the very kerf and spur upon which so much stress has been laid, were old and well known, both in the concrete art and in the metal working art, is conclusively shown by Drawing No. 3. The sources from which these "common mechanical expedients" are drawn are plainly shown in the other drawings; what the patentee did was solely to benefit by the previous ingenuity of other men; to select only. Selection is not invention.

Now that under some circumstances might be invention. If there be *a new result* accomplished by the putting of the things together in that special way; or if the improvement is such that what is done is accepted and drives out other

devices in the art and goes into use,—is paid for, in the other words—that might be invention. But that must be apparent *from the record* before any weight can be given to the allegation; and the evidence must show that the thing which was done was due to the letters-patent in suit, and not independently conceived and executed by someone else; it must be shown that it is *the thing which the patentee devised,* and not some improved form or a somewhat similar device, which has gone into use. "In the law of patents it is the last step that wins", says Judge Coxe in one of his well-known opinions. So it is in the commercial exploitation of any device. The record shows that what Mr. Vandenburgh did *never went into use* anywhere, and so far as the present record is concerned, there is no evidence that the structure which he sketched ever was built by anybody, anywhere. Assuming for the sake of argument that what defendant did was derived from it (which the plaintiff himself has stipulated was not the case), that is not enough; because the alteration of it, the making of it collapsible, was the "last step" which turned it from a futile thing too bulky and clumsy for shipment to a commercial article. That was *due to the defendant,* and to nothing derived from plaintiff's patent.

Costs.

Ordinarily, the question of costs does not come here; but, as in the Consolidated Gas case, it is proper to refer to it when the case is other-

wise in this Court.

Section 973 of the Revised Statutes of the United States* provides that no costs shall be allowed the plaintiff if any part of his patent covers matter not belonging to him, speaking colloquially. This has uniformly been interpreted to mean that no costs shall be allowed if any of the claims is declared to be void. Claim 1 and 2 of the reissue have been declared void by every court that has passed on them. They have never been disclaimed, although invalidated five years ago. In spite of this provision, the court below allowed half costs in the original case, which we have had to pay; and has compelled us to pay the Master's fee in this case. If this court shall be of the opinion that the bill below should be dismissed, we ask such an order as may be appropriate under these conditions; and in any event, we are entitled to a refund of these costs.

No court has ever discussed fully the question whether a plaintiff who succeeds on one claim is entitled to the same recovery as one who succeeds on all the claims of his letters-patent. In the instant case the plaintiff has succeeded on two claims only out of seven; one of these claim 5, by clear inadvertence, since regardless

* "Section 973. When judgment or decree is rendered for the plaintiff or complainant, in any suit at law or in equity, for the infringement of part of a patent, in which it appears that the patentee, in his specification, claimed to be the original and first inventor or discoverer of any material or substantial part of the thing patented, of which he was not the original and first inventor, no costs shall be recovered, unless the proper disclaimer, as provided by the patent laws, has been entered at the Patent Office before the suit was brought."

of any other consideration the defendant's structure does not respond even to the terms of the claim. Practically, therefore, he is given the entire profit of the defendant (who is not allowed to recoup his losses from the same branch of the business, as good accounting would require) for the infringement of one-seventh of the letters-patent. If all the claims had been infringed, would the plaintiff have been entitled to seven times the total profit?

Conclusion.

We ask the Court to reverse the decision below and send the case back to the District Court with a direction to dismiss the bill with costs, including a recovery of those already paid by the defendant; because

(A) The original letters-patent were invalid for anticipation, in view of the construction placed on them by the plaintiff; and in any event for the want of invention in view of the prior art.

(B) The reissued letters-patent are invalid, because the plaintiff had nothing to surrender; the delay of nine years and over was too great; the expansion was illegal; the plaintiff was estopped, as against this defendant, to assert that his patent covered a collapsible structure.

(C) The defendant did not infringe; the letters-patent being for an improvement only and restricted to a rigid structure, while defendant

makes only a collapsible one; because claim 3 was cancelled in the original prosecution of the case and could not be re-asserted; because claim 5 does not read on the defendant's structure, inasmuch as in that the diagonal kerfs all point in the same direction, and one-half of them do not point "towards the center" of the bar.

(D) No adequate proof of apportionment of profits was given, either between prior structures and the plaintiff's; or between the plaintiff's stiff structure and the collapsible one of the defendant.

CONCRETE STEEL COMPANY,
Petitioner.

By THOMAS J. JOHNSTON,
Of Counsel.

THOMAS J. JOHNSTON,
LUCIUS E. VARNEY,
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Of Counsel.

APPENDIX A.

List of Cases on Patent in Suit.

Vandenburgh *v.* Concrete Steel Company. This case. Hough, J., D. C. S. D. N. Y. Not reported (Transcript, p. 134).

C. C. A. 2nd Circuit, 1st Appeal. Ward, J., 258 F. R., 143 (Transcript p. 150).

D. C. S. D. N. Y. Not reported. Knox, J. (Transcript p. 345).

C. C. A. 2nd Circuit, 2nd Appeal. Mayer, J. Not reported (Transcript, p. 398).

Vandenburgh *v.* Electric Welding Company, D. C. W. D. Pa. Orr, J. Not reported.

C. C. A. 3rd Circuit. Buffington, J., 263 F. R., 95.

Vandenburgh *v.* Truscon Steel Company, D. C. N. D. O. Westenhaver, J. Not reported. (Appendix C).

C. C. A. 6th Circuit. Knappen, J., 277 F. R., 345.

Vandenburgh *v.* United States. Court of Claims. No decision.

APPENDIX B.

Cases Involving Concrete Reinforcing.

(Robinson Sec. 78)

Hennebique Construction Co. *v.* Armored Concrete Constr. Co., 163 F. R., 300 (Appeal) 169 F. R. 287.

Ranson Concrete Co. *v.* German American Button Co., 197 F. R., 172 (Appeal) 201 F. R., 528.

Turner *v.* Moore, 198 F. R., 134 (Appeal) 211 F. R., 466.

Carter *v.* Burch Plough Works, 211 F. R., 481 (No Appeal).

Thacher *v.* Baltimore, 219 F. R., 909 (Appeal) 230 F. R., 1022.

Drum *v. Turner*, 209 F. R., 854 (Appeal) 219 F. R., 188.

Trussed Concrete Steel Co. *v.* Goldberg, no report in D. C. (Appeal) 222 F. R., 506.

Besser *v.* Merillat Culver Core Co., 266 F. R., 783 (Appeal) 243 F. R., 611.

Luten *v.* Sharp, 217 F. R., 76 (Appeal) 234 F. R., 880.

United States Column Co. *v.* Benham Column Co., 225 F. R., 55 (Appeal) 238 F. R., 200.

Turner *v.* Lauter Piano Co., 236 F. R., 252 (Appeal) 248 F. R., 930.

Turner *v.* Deere etc., Co., 238 F. R., 377 (Appeal) 249 F. R., 752.

Luten *v.* Washburn, No. D. C. report (Appeal) 253 F. R., 950.

Luten *v.* Reinforced Concrete Co., 254 F. R., 107 (Appeal) 263 F. R., 983.

Luten *v.* Allen, 254 F. R., 587 (Appeal) 263 F. R., 986.

Luten *v.* Young, 254 F. R., 591 (Appeal) 263 F. R., 986.

Luten *v.* Marsh, 254 F. R., 701 (No Appeal).

Bone *v.* Marion County (Appeal) 249 F. R., 211 (Certiorari) 251 U. S., 134.

Ferro Concrete Steel Co. *v.* Concrete Steel Co., (Appeal) 206 F. R., 666.

City of Akron *v.* Bone, no D. C. report (Appeal) 221 F. R., 944 (nullified by Bone *v.* Marion County, 251 U. S., 134).

Luten *v.* Whittier, no D. C. report (Appeal) 251 F. R., 590.

Berger Mfg. Co. *v.* Trussed Steel Concrete Co. no D. C. report (Appeal) 257 F. R., 741.

Thacher *v.* Transit Constr. Co., 228 F. R., 908 (No Appeal).

Trussed Concrete Co. *v.* Corrugated Bar Co., 214 F. R., 393 (Appeal) 222 F. R., 514.

Luten *v. Scott,* 263 F. R., 721 (No Appeal).

Condron *v.* Corrugated Bar Co., 256 F. R., 672 (Appeal) 279 F. R., 867.

Of 26 D. C. cases and 22 appeals, plaintiff succeeded in 3 cases; the weight of one of which (Bone *v.* Akron) was neutralized by certiorari in Bone *v.* Marion County.

APPENDIX C.

Opinions of Other Courts.

IN THE

DISTRICT COURT OF THE UNITED STATES,

FOR THE WESTERN DISTRICT OF PENNSYLVANIA.

GEORGE E. VANDENBURGH, vs. ELECTRIC WELDING COMPANY.	No. 127 May Term, 1917. In Equity. ORR, *J.*

The plaintiff who is the patentee and owner of reissued patent No. 14,182, dated August 15, 1916, for a "reinforcing-bar," filed his bill, against the defendant charging that the defendant has infringed plaintiff's rights under said re-issued patent and demanding an accounting. The bill is in the ordinary form. The answer set up that the patent is invalid and further that if the patent could by any means be adjudged valid, yet defendant has not and does not use the device of the patent and therefore does not infringe any of plaintiff's rights granted to him by the said patent. By stipulation filed claims one, two and three of the re-issued patent are involved.

The original patent is No. 841,741 and was issued January 22, 1907, upon an application

filed May 9, 1906. The drawings attached to the re-issued patent are the same as those attached to the original patent, except that they are upon a smaller scale. The specification of the reissued patent is for all purposes necessary for the consideration of this case, the same as the specification of the original patent. The only difference between the two patents is in the matter of the claims which for the present need not be considered.

The patent relates to the art of reinforcing concrete. It is one of an exceedingly large number in that art, many of which have been submitted to this court in other cases in which the art has received consideration. In none of these cases has there been the same evidence of prior uses or the same evidence as to th state of the art at and immediately before the time when the various patents under consideration were applied for. In the present case the evidence of the state of the art at and before the time of the application by the plaintiff for his original patent is more voluminous than in any case that has been brought hitherto before this court. The evidence in this case shows that the study of methods of reinforcing concrete has been intense and widespread for years. The object of reinforcement is to give strength in those parts of the concrete structure where strains may be expected. Building operations close to the public streets and bridges and road construction on highways and along railroads have made the general public familiar with the facts that long rods and bars, short rods and bars, rods and bars with angles or with curves

or loops, wire meshwork and meshwork of other materials are all sometimes severally used for that purpose. The calculation of stresses by constructing engineers and the introduction into the concrete mass of reinforcing members where such stress is likely to be found are matters in which the public is so largely interested that serious consideration should be given to the question of the validity of the patent, although as between the parties to the litigation the case may be disposed of because infringement is not found.

It is not necessary to give a pictorial illustration of the plaintiff's structure. It suggests the pen holder rack which for many years has been found on writing desks and which consists of a horizontal spiral coil of wire fastened to a base by means of which these separate coils are maintained in a general vertical position.

We refer now to the specification and find that the patentee sets forth the nature and object of what he calls his invention in the following language:

> "This invention relates to a reinforcing-bar particularly adapted for cement and concrete construction wherein the bar is embedded in the plastic body to be supported thereby.
>
> The invention has for an object to provide a reinforcing-bar with one or more spirally-disposed coils secured to the bar so as to provide an extended area of contact adapted to resist strain longitudinally and laterally of the bar and to form a truss within the body of concrete or other plastic

material which provides the maximum of supporting strength in the arch or surface to be formed.

Other and further objects and advantages of the invention will be hereinafter set forth, and the novel features thereof defined by the appended claims."

He emphasizes his preferred construction as being "thus providing a construction in which all lateral pull or strain of the coil is avoided, owing to the equalization thereof by the oppositely-extending coils and the tendency of the coils to move or flatten toward the face of the bar resisted". He mentions a preferred means of securing the coils to the bar by setting the coils within kerfs and holding them therein by means of integral spurs "which are forced downward upon the coils when inserted and permanently retain them in position".

It was urged at the trial that one of the special advantages of the plaintiff's construction was its collapsibility and therefore its suitability for transportation from the place of manufacture to the place of use. The structure of the patent is not collapsible. The quotations above indicate it. If the integral spurs are *forced* down upon the coils and *permanently* retain them in position there can be no collapsibility. The bar to which the coils are attached is a spacing member in its relation to the plaintiff's structure. In its relation to the concrete structure it may or may not be a reinforcing member dependent upon an engineer's determination of stress to be relieved. The reinforcing bar of the patent, however, embraces both the

helicoidal coil and the bar just referred to which may be called the spacing member. That collapsibility was not a feature of the structure of the plaintiff under the original patent is clear because the first two claims of that patent require the spiral coil to be "rigidly secured" to the bar and none of the other claims indicate a different relation between the two. In the reissued patent the first two claims of the original patent have been eliminated. It will be noticed in reading the three claims of the reissued patent which are in suit, as hereinafter quoted, that the first two require the spiral coil to be "permanently secured" to the bar, and that the third indicates it because it required the overlapping spur to retain beneath it a convolution of the coil. The three claims are as follows:

"1. A concrete reinforcing consisting of a bar having a plurality of integral spurs, and a spiral coil permanently secured thereto by having the spurs bent down on the several coils, the coils extending beyond and free of the bar at the opposite side therefrom to the securing point.

2. A concrete reinforcing consisting of a bar having integral means to secure a coil thereto, and a spiral coil permanently secured to the bar in each convolution and extended beyond and free of said bar at the opposite side therefrom to the securing point.

3. A reinforcing-bar provided upon one edge with a series of kerfs each having an

integral over-lapping spur, and a coil disposed in said kerfs, each convolution thereof being retained beneath one of said spurs".

Being satisfied that collapsibility was not a feature of the device of the first patent, the court is equally satisfied that if collapsibility may be found to be disclosed in the reissued patent, then the reissued patent was broader than the original and should not have been granted. The evidence clearly discloses that intervening rights have arisen; therefore the reissued patent must be held invalid as being broader than the original to the extent at least that there is a disclosure therein of collapsibility in the plaintiff's structure.

However, it is unnecessary to decide this case upon the question as to whether or not the plaintiff's structure is collapsible or whether it is rigid or otherwise permanent in the relations between the coil and the bar. This court is satisfied that there was no invention upon the part of the plaintiff. There is no suggestion throughout the record that the bar of the plaintiff has met any predetermined engineering demands in concrete construction. Helicoidal bars, wires, hoops and methods of attaching the same to bars for the purpose of keeping apart the several convolutions thereof are old in the art. The attachment of wire to bars or sheets of metal by overlapping spurs of kerfs is old. The patent has no novelty.

It is unnecessary to set forth with any degree of particularity the various patents and pub-

lications which have led the court to this conclusion. However, much light may be thrown upon the subject by referring to "Experimental Researches on Reinforced Concrete" by Armand Considere, translated into English and published in New York in 1903.

In the view this court has taken in this case, it is unnecessary to dwell on the subject of infringement. If by any possibility, the patent could be held valid, it is most limited in its scope. If valid and thus limited, there has been no infringement.

The bill of complaint must be dismissed at plaintiff's cost.

VANDENBURGH *v.* ELECTRIC WELDING CO.

(Circuit Court of Appeals, Third Circuit. February 19, 1920. Rehearing Denied March 29, 1920.)

No. 2479.

Before: BUFFINGTON, WOOLLEY and MORRIS, *JJ.*

BUFFINGTON, *Circuit Judge.* On January 22, 1907, there was issued to George E. Vandenburgh patent No. 841,741, for a reinforcing bar. On August 15, 1916, a reissue of said patent was granted, No. 14,182. This reissue made no change from the original, either in the specification, in the figures, or in claim 3, here in issue; but claims 1 and 2, here in issue, are new. Vandenburgh having charged the Electric Welding Company with infringing said three claims of the reissue and the court below having, on final hearing, held the claims invalid and dismissed the bill, Vandenburgh took this appeal.

(1) After argument and due consideration, we are of opinion the court below made no error in dismissing the bill. The grounds of our conclusion we now record:

The combination device, which Vandenburgh disclosed in his specification, was a particular type of attachments of coils and reinforcing bars

in concrete work. Both coils of wire and reinforcing bars to which such coils were attached were prior devices in use in that art. Taking these two familiar devices of coil and bar, Vandenburgh disclosed a new way of attaching the coil and bar for use in the concrete reinforcing art, to wit, by the use of kerf or cut in the side of the bar in which the coil was placed, and a tongue or spur overlapping the kerf, which spur, when bent down, served to hold the coil in place. This seating of the bar in the kerf cut and keeping it in place by the overlapping spur or tongue, Vandenburgh set forth in his specification as follows:

> "As a preferred means of securing the coils to the bar I have shown a series of kerfs 8 in *one face of the bar* inclined away from the center of the bar toward the opposite ends thereof, and the coils are seated within these kerfs and *held therein* by means of the integral spurs 9, *which are forced downward* upon the coils when inserted and *permanently retain them in position*"

—and embodied in his third claim as follows:

> "A reinforcing bar provided upon *one end* with a series of kerfs, each having an integral overlapping spur, and a coil disposed in said kerfs; each convolution thereof being retained beneath one of said spurs".

Now, while a kerf or cut in the edge of a bar was a common mechanical expedient, no one had used it in concrete reinforcement, until

Vandenburgh disclosed his device. But, other than a combination using a kerf, Vandenburgh disclosed nothing new in his specification. Finding his kerfed combination novel, regarding it as useful, and assuming for present purposes, as we will, that it embodied invention, there is no reason for regarding it as other than a narrow contribution to the art of a specific type of coil and bar attachment. In the nine years between its grant and the filing of this bill, Vandenburgh's patent made no impress in the art, and we give the patentee the full measure of his disclosure and the protection of his claim by limiting his field of monopoly to a reinforcing bar with a kerf and an integral overlapping spur, as embodied in his third claim.

Thus limited, such claim is not infringed by the defendant's structure. It has coils, which as we have seen, are old; it has a reinforcing bar, which is also old; and the two are attached, but the crux is: How are they attached? Are they attached by a kerf cut? Mere attachment of bar and coil were old, and Vandenburg's advance consisted, not in bar and coil attachment generally, but in the kerf and spur attachment. This form of attachment being the gist of Vandenburg's patent, it must be the test of defendant's infringement, or, in other words, does the defendant use the kerf and spur attachment of Vandenburgh's claim? In our judgment, it does not. The kerf of the claim is upon one end, which can only mean one edge of the reinforcing bar, which end or edge cut is the only form of bar and kerf cut disclosed

by Vandenburgh, and his bar is a flat bar, and the kerfs are cut diagonally into the edge of such flat bar. On the other hand, the bar of the defendant's device consists of a channel bar and there is no cut of any kind in the end or edge of either of the channel sides. On the contrary, attachment in defendant's bar is made by using the back body of the central bar of the channel and stamping a tongue out of said solid central back portion, and then winding such tongue over the coil, which does not rest in the body of the bar but outside of it.

It will thus be seen the defendant's coil is not restrained by the body of the bar, or by the side of any cut in the body of the bar, but is restrained wholly by the tongue, which surrounds and holds the coil. In Vandenburgh's structure, the tongue or spur simply holds the coil in the kerf recess, and it is the cut sides of the kerf which hold the coil in place. If Vandenburgh's spur or tongue broke, the kerf sides would still have a coil-restraining function. But in defendant's device the sides of the cut in the body structure do not retain or hold the coil; that is the function of the stamped out, coil-encircling tongue. If defendant's tongue broke, there would be absolutely no coil and bar attachment or restraint, for the cut in the bar has no functional purpose whatever, save to create a tongue, and the attaching, functional agency of defendant's tongue would be the same if no cut in the reinforcing bar were made but the tongue was made by riveting it on the reinforcing bar. For these reasons we are clear

defendant's structure does not infringe the third claim.

(2) Seeing, then, that the kerf and overlapping spur in combination constituted the real invention of Vandenburgh, and that he disclosed no other form of attachment, it is quite evident he was not entitled to broad claims of the generic type, which he secured on the reissue in claims 1 and 2. Kerf and overlapping spurs are not embodied in these claims, and it is manifest that these claims, unrestricted by the limitation of kerfs and spur, were only added 9 years after his patent was granted, to make infringers of those who used other forms of attachment than the kerf and overlapping spur, which alone Vandenburgh disclosed, and which were the sole warrant for the grant of his patent.

Such being the case, it is clear the court below was not in error in dismissing the bill.

IN THE

DISTRICT COURT OF THE UNITED STATES,

NORTHERN DISTRICT OF OHIO—EASTERN DIVISION.

GEORGE E. VANDENBURGH, Complainant, vs. TRUSCON STEEL COMPANY, Defendant.	In Equity. No. 500.

WESTENHAVER, *District Judge.*

Plaintiff's bill is in the usual form, charging infringement by defendant of United States Re-issue Letters Patent No. 14,182 granted to him August 15, 1916, being a re-issue of letters Patent No. 841,471, granted January 22, 1907. The subject of the patent is for a reinforcing bar to be used in concrete construction. On this hearing, claims 1 and 3 only are in issue and relied on. The defenses are invalidity for lack of invention, and non-infringement.

This re-issue patent has been the subject of previous litigation in the Second and Third Circuits. Circuit Judge Hough, May 13th, 1918, held, in effect, that claims 1 and 2 of the re-issue patent are invalid if the change made therein from the words "rigidly secured" of the original

patent, to "permanently secured" of the reissue claims embody a different meaning than the original; that claim 3 was not infringed by a construction substantially, if not exactly similar to the construction here involved; and, finally, that the only invention disclosed by the specifications is the exact construction described and pictured in Figs. 1 and 6. On appeal, the Circuit Court of Appeals of the Second Circuit held that claims 1 and 2 of the reissue were invalid as too broad, and, in effect, that claim 3 was valid and infringed. The opinion is brief and contains no review of the prior art. It seems to assume that Judge Hough has disposed of the controversy below on the ground only of non-infringement; and seems to assume rather than to attempt to demonstrate that the feature found to be novel as disclosed by the specifications and covered by claim 3 was, in view of the prior art, patentably novel.

In the Third Circuit, District Judge Orr, December 6, 1918, also held that claims 1 and 2 were invalid because too broad, as stated in the opinion of the Court of Appeals, Second Circuit, and also held that claim 3, in view of the prior art, was invalid for lack of invention. On appeal, the Circuit Court of Appeals agreed that claims 1 and 2 were invalid because too broad, but, assuming the validity of claim 3, held that, being limited, as it must, in view of the prior art, to the specific construction therein disclosed and claimed, was not infringed by a construction somewhat different from the construction here involved. We do not understand

this opinion as deciding that claim 3 was valid.

On the hearing before me, the controversy was directed almost entirely to the validity of claim 3, although claim 1 was likewise in issue and relied on. In view of the attitude thus assumed by plaintiff's counsel, and the further fact that all the judges who have heretofore considered and passed on claims 1 and 2 have held them to be invalid because too broad, I shall adopt that conclusion without further statement of my reasons than to say that I fully agree both in the conclusion reached and in the reasons given to support it.

Plaintiff's invention is described in his patent as being a reinforcing bar particularly adapted for cement and concrete construction wherein the bar is embedded in the plastic body to be supported thereby. Fig. 6 discloses an adaptation of this reinforcing bar for column or pillar construction, but no contention is made that this is infringed by defendant. Fig. 4, plaintiff contends, also discloses an adaptation of this reinforcing bar for column construction, and that this is also infringed. This contention is disputed, defendant insisting that Fig. 4 is a detail only of a simple and inexpensive form of the beam construction disclosed in Fig. 1. Assuming without admitting plaintiff's contention to be true, Fig. 4 shows merely a bar with a spiral coil attached to the bar at each convolution by a kerf inclined at an angle to the edge of the bar in such a way as to produce an overlapping integral spur, with this spur hammered down so as to hold rigidly this spiral. Defendant

makes and sells a collapsible spiral used in strengthening concrete columns or pillars. It consists of a cylindrical spiral of steel wire usually fitted to two bars or spacers, with each convolution of the spiral engaging the spacers at regular intervals. The engagement is so loose fitting that this construction, which is normally stove-pipe-shaped, can be made flat for shipment by moving the metal rods or spacers longitudinally in opposite directions. The method whereby the spiral is attached to the spacer bar is a rectangular notch in the bar, with one or both corners peened or hammered down so as to retain and hold loosely the spiral. Fig. 4 and claim 3 of plaintiff's patent, it is contended, embody and cover this construction; hence the charge of infringement.

The differences in the method of attaching the spiral to the bar, the result accomplished, and the special collapsible mode of operation, between defendant's and plaintiff's construction are such that were I to adopt the limited and narrow construction given to claim 3 by the Third Circuit Court of Appeals, I might likewise dispose of this controversy by holding plaintiff's patent not to be infringed. The inclined kerf method of attachment, with an integral overlapping spur holding the spiral rigidly to the reinforcing bar or spacer, is not the exact method of attachment used by defendant. The kerfs or plaintiff's patent are required to be cut at an inclined angle to the edge of the bar, thereby creating an integral overlapping spur. This kerf and spur when hammered down, the disclosures of the patent show, were

intended to and do hold the spiral rigidly or permanently in place. Defendant's spacing bars have merely a rectangular notch cut at right angles in the spacing bar, and when one or both corners are hammered down, the spiral is not held rigidly or permanently in place, but so loosely as to permit of collapsing. These differences in construction are as substantial as those held not to infringe by the Third Circuit Court of Appeals. This, however, seems to me to be too narrow a ground upon which to dispose of this controversy. It seems to me that if plaintiff's patent is valid because novel and useful in a patentable sense, the charge of infringement could not be repelled by such an insubstantial difference in the method of attachment; particularly as plaintiff's patent suggests this method merely as a preferred method. I have therefore given careful consideration to the charge of infringement.

My conclusion is that if Fig. 4 and claim 3 disclose and cover a concrete reinforcement for columns and pillars of the character now claimed by plaintiff and as is constructed and used by defendant and others, the claim must be held void for want of patentable novelty. My reasons for this conclusion may be briefly stated.

Plaintiff's original application was filed May 8, 1906, and this must be taken as the date of his invention. True, on this hearing he offered some testimony which is not sufficient, in my opinion, according to well settled rules, to establish an earlier date. The concrete reinforcement art for columns and pillars was at this

date quite well developed, although it had not come into such general and extensive use as it now enjoys. This art had been described in standard technical treatises and disclosed in numerous patents and practical constructions. Armand Considere, a French engineer, in a standard work, translated and published in New York, in 1903, teaches all that can now be claimed by plaintiff for his patent or that is now done by the defendant in the matter of buildings and reinforcing concrete columns, except perhaps the kerf and spur method of attaching the spiral to the spacing or reinforcing bar or bars. This is, in fact, admitted by plaintiff. Hoops, circular bands, and continuous spirals attached to spacing or reinforcing bars as a method of concrete reinforcement for columns or pillars is also disclosed by numerous patents. See Hyatt British Patent No. 1715, 1874, Pelegren French Patent No. 323,457, 1902, Considere United States Patent No. 752,523, 1904, Kieserling & Moller German Patent No. 73004, 1892. Similar constructions are also described and illustrated by Christophe in an article published in 1902, by Marquess in an article published in the Engineering News of New York in 1904, and also in other articles and illustrations in the Engineering News of March 8, 1906, and June 15, 1905.

In some the method of attaching the spiral to the bar is also disclosed. Kieserling & Moller, above noted, discloses a notch in the outer edge of the spacing bar designed to contain and hold the coils. Cummings, U. S. Letters Patent No.

822,587, application dated January 6, 1905, patent date June 6, 1906, shows circular, but not spiral, reinforcing bands for a concrete column attached to the spacer bars by tongues stamped out and then pressed and hammered down over the bands. Christophe, in the article above referred to, discloses notches on the exterior faces of the spacing bars to contain and hold the spiral.

In the metal working arts, numerous patents disclose kerfs or notches, including inclined kerfs with overlapping spurs, as a means of attaching coils or spirals to bars. See the following U. S. Letters Patent: Norwood, No. 571,575, 1896; Clark, No. 589,593, 1897; Carson, No. 278,282; McCall, No. 657,827; Caldwell, No. 682,386, 1901; Prescott & Bennett, No. 447,162, 1891, and Eason, No. 723,632, 1903. Of these patents, Norwood and Eason disclose the inclined kerf with the overlapping integral spur, and Prescott & Bennett discloses a rectangular notch or kerf cut at right angles to the edge of the bar with the corners hammered down in the manner of defendant's construction.

Thus it appears that all the elements, both of claim 3 of plaintiff's patent and of defendant's construction, are old. Plaintiff's counsel, as already said, admits this to be true, but contends that the reinforced concrete art does not show the kerf and spur in a combination with reinforcing or spacer bar or bars and a continuous spiral, and that this novelty is of a patentable character. This claim of novelty is not true in view of Kieserling & Moller and Christophe's disclosure unless plaintiff's kerf

is to be limited to a kerf inclined at such an angle to the edge of the spacer bar as to create and form an integral overlapping spur. It is the latter method only of attachment which is not plainly shown in the prior art. The numerous examples of hoops, circular bands, and continuous spirals in combination with spacing or reinforcing bars found in the concrete art do not explicitly call for an inclined kerf and integral overlapping spur method of attachment. Notches in which to seat and hold the spiral are, however, called for and disclosed. Doubtless, engineers like Considere, Christophe, and Marquess, as well as numerous inventors, assume that any reasonably skilled mechanic or engineer would know the means used and available in the metal working art to accomplish this result, and regarded it as unnecessary to make further disclosures or to give more specific directions. Plaintiff's contention, however, now is that any kind of kerf or notch is covered by his patent, and this claim comes in conflict literally with the existing prior art.

Furthermore, invention cannot, in my opinion, be based on the adaptation of the familiar inclined kerf with an integral overlapping spur of the metal working art to its assumed new use in the concrete reinforcing art. Let it once be assumed, as plaintiff's counsel concedes, that the concrete reinforcing art teaches that the proper method of reinforcing a concrete column or pillar is to use hoops or circular bands, or continuous spirals, spaced at regular intervals around spacer or reinforcing bars and attached

hereto, then the problem of making this attachment becomes no longer one peculiar to the concrete reinforcing art but belongs to the metal working art. The problem is one of the metal worker, and not of the concrete engineer. For this reason, all the means known to the latter art or used by workers therein, must be regarded as the common posession of all persons skilled in either art, and invention cannot be predicated upon a transfer of a device familiar in one to a like use in the other; particularly is this true when no new principle of operation, and no new function is accomplished or performed as a result of the transfer to the new combination.

That invention is not present under these conditions, and does not result from such an adaptation of an old device, is well settled by numerous decisions. See: *Huebner-Toledo Breweries Co.* vs. *Mathews Gravity Carrier Co.* (6 C. C. A.) 253 Fed., 435; *Berger Mfg. Co.* vs. *Trussed Concrete Steel Co.* (6 C. C. A.) 257 Fed., 741; *Van Dorn Iron Works Co.* vs. *Mathis Bros. Co.* (6 C. C. A.) 260 Fed., 400, 405-6. The language of Judge Warrington in the case first cited, is equally applicable. here. "It must, of course, be conceded that patentable novelty may exist in a combination of old elements; but here the combination claims in suit are lacking in the usual and essential tests of invention. No new function of elements or new method of operation is evolved, and the result achieved is exactly the same as the old one. The settled rule under such facts is that to adapt

an old and familiar device to another structure equally old and well known is not to exercise the inventive faculty; it is to apply the skill of the mechanic".

Plaintiff made his alleged invention in an art already crowded and highly developed. The evidence shows that commercially he has contributed nothing whatever to the progress of reinforced concrete construction. No buildings or column were ever constructed by any one under his patent prior to 1916. Two licenses only have been issued by him, the first in the latter part of 1916, under which no business appears to have been done except perhaps to put up one structure, and the other followed the favorable decision in the Second Circuit. Claim 3 of his patent consequently is only another example of that class of patents described by Mr. Justice Bradley in *Atlantic Works* vs. *Brady*, 107 U. S., 192, (and recently approved and re-announced by Mr. Justice Clarke in *Elyria Iron & Steel Co.* vs. *Railway Supply Co.*, 242 U. S., 609, in these words: "The process of development in manufactures creates a constant demand for new appliances, which the skill of ordinary head workmen and engineers is generally adequate to devise, and which, indeed, are the natural and proper outgrowth of such development. Each step forward prepares the way for the next, and each is usually taken by spontaneous trials and attempts in a hundred different places. To grant to a single party a monopoly of every slight advance made, except where the exercise of invention, somewhat above ordinary mechanical or engineering skill,

is distinctly shown, is unjust in principle and injurious in its consequence"). See also: *Railroad Supply Co.* vs. *Elyria Iron & Steel Co.* 244 U. S., 285; *Package Mach. Co.* vs. *Johnston Automatic Sealer Co.* (6 C. C. A.) 246 Fed., 598, 601; *A. Schrader's Son, Inc.* vs. *Dill Mfg. Co.* (6 C. C. A.) 262 Fed., 504.

This conclusion is reached on the assumption that plaintiff's patent and claim 3 discloses what is claimed to be his invention. Personally, however, I agree also with Judge Hough's conclusion that plaintiff's invention was not what he now claims and that what is now claimed is not thereby disclosed, but the only invention disclosed by his specifications and claims is the exact construction described and pictured in Figs. 1 and 6, as to which no charge of infringement is made.

For these reasons plaintiff's bill will be dismissed at his costs.

D. C. WESTENHAVER,
Judge.

Cleveland, Ohio,
September 23, 1920.

UNITED STATES CIRCUIT COURT OF APPEALS,

SIXTH CIRCUIT.

Before: KNAPPEN, DENISON and DONAHUE, *Circuit Judges*:

KNAPPEN, *Circuit Judge*: Suit for infringement of claims 1 and 3 of reissued patent No. 14, 182 (August 15, 1916) to Vandenburgh. The original patent, No. 841,741, was issued January 22, 1907. The application for reissue was filed July 1, 1916. The invention relates generally to reeinforced concrete construction. Its prominently-stated specific object is to "provide a reinforcing bar with one or more spirally-disposed coils secured to the bar so as to provide an extended area of contact adapted to resist strain longitudinally and laterally on the bar, and to form a truss within the body of concrete, etc". As a preferred means of securing the coils to the bar the specification discloses "a series of kerfs in one face of the bar inclined away from the center of the bar toward the opposite ends thereof", the coils being "seated within these kerfs and held therein by means of the integral spurs, which are forced downward upon the coils when inserted and permanently retain them in position." The specifications, considered in connection with the drawings, plainly show an integral spur overlapping

the kerf, which when forced downward upon the coils holds them rigidly in position. Claims 1 and 3 read as follows:

> "1. A concrete reinforcing consisting of a bar having a plurality of integral spurs, and a spiral coil permanently secured thereto by having the spurs bent down on the several coils, the coils extending beyond and free of the bar at the opposite side therefrom to the securing point".
>
> "3. A reinforcing bar provided upon one edge with a series of kerfs each having an integral overlapping spur, and a coil disposed in said kerfs, each convolution thereof being retained beneath one of said spurs".

The defenses are invalidity of the reissue, lack of invention and noninfringement. The district court held claim 1 invalid as too broad, and claim 3 void for lack of patentabie novelty, if construed broadly enough to embrace defendant's structure. The appeal is from a decree dismissing the bill.

The district court was plainly right in holding claim 1 invalid. As will later appear, the only novelty in plaintiff's conception is in the specific method of attaching the coils to the bar by kerfs therein and integral spurs rigidly securing the coils within the kerfs. The claims of the original patent, which were replaced by claims 1 and 2 of the reissue, in terms call for a rigid fastening. The omission of the requirement of rigidity in claims 1 and 2 was apparently intended to cover the feature of collapsibility found in later devices. Claim 1 of the reissue

is thus unwarrantably broad. The same conclusion has been reached by the Circuit Court of Appeals of both the second[1] and third[2] circuits. Claims 3 of the reissue differs from the third claim of the original patent only in the substitution in the reissue of the word "edge" for the word "end" in the original. This is plainly merely a correction of a clerical error. It thus becomes unnecessary to give further consideration to the question of the validity of the reissue.

The real date of plaintiff's invention is more or less material in determining what is prior art as related to invention. Plaintiff's original application was filed May 9, 1906. He attempted to carry the actual date of his invention back to 1903, and offered some testimony tending to show such earlier invention date. The trial judge held the testimony not sufficient to establish such earlier date. We cannot disturb this conclusion. The evidence consisted solely of the oral testimony of plaintiff and another witness, taken in open court. Under well-settled rules, the burden rested heavily upon plaintiff to establish the fact of the asserted earlier date of invention to the satisfaction of the court,—whether or not such satisfaction is required to be beyond a reasonable doubt. *St. Paul Plow Works* v. *Starling*, 140 U. S., 184, 198; *Clark Co.* v. *Willimantic Co. ibid.* 481, 492; *Moline* v. *Rock Island* (C. C. A., 7), 212 Fed., 727, 732; *Barber* v. *Otis* (C. C. A., 2), 271 Fed.,

1 *Vandenburgh* v. *Concrete Steel Co.*, 258 Fed., 143.
2 *Vandenburgh* v. *Electric Welding Co.*, 263 Fed., 95.

171, 180. The question presented was one of fact only, depending upon the weight to be given this oral testimony; and the trial court's conclusion thereon must be accepted here unless the evidence decidedly preponderates against it. *Pugh* v. *Snodgrass* (C. C. A., 6), 209 Fed., 325. Assuming that we are at liberty, upon this record,[3] to consider this testimony, it is enough to say that the evidence does not preponderate against the conclusion of the trial judge.

Turning to claim 3: The art of steel-reinforced concrete construction generally was highly developed before Vandenburgh entered the field. It had been applied not only to the construction of bridges, spandrel walls, dock walls, retaining walls and fireproof floor construction, but specifically to beam, girder and column construction in manufacturing and other buildings.[4] The art, generally speaking, was already old and crowded, although the more extensive and rapid use of metal-reinforced concrete came a little later. Truss reinforcement of concrete beams was also old, through the use of radially disposed projections from the tension member (either perpendicularly or obliquely thereto), as well as otherwise. See: *Trussed Concrete Steel C.* v. *Goldberg* (C. C. A., 6), 222 Fed., 506, 509 *et seq.* The art with which we are here

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[3] The testimony is not certified as settled and approved by the trial judge, as required by General Equity Rule 75 (b). It appears to have been merely stipulated by counsel.

[4] We may refer in this connection to the following decisions of this court: *Ferro Concrete Steel Co.* v. *Concrete Steel Co.*, 206 Fed., 666; *City of Akron* v. *Bone*, 221 Fed., 944; *Detroit Iron & Steel Co.* v. *Carey*, 236 Fed., 924; *Luten* v. *Whittier*, 251 Fed., 590.

concerned relates to that form of column construction called "column hooping". While Vandenburgh's invention seems more specially adapted to beam and girder construction, it is declared by the specification to be applicable to column construction as well; and we shall treat the disclosure not only as so applicable, but as intended to cover a plurality of vertical reinforcing or spacing members around and upon which steel reinforcement is wound in spiral form. Vandenburgh was not a pioneer in this field. Hyatt (by British patent, 1874), and Lee (also by British patent, in 1885) had disclosed iron bands looped spirally to reinforcing members, the spirals being riveted to each other or to the vertical reinforcement. Kieserling (German patent, 1894) had disclosed columnar reinforcement by way of a series of loops attached to vertical members by square notches therein. Column hooping seems to have become active abroad about the year 1902, and in the United States about a year later; and in articles published in 1902 and 1904 column hooping was described and illustrated, the 1902 publication disclosing notches on the exterior faces of the supporting members to contain and hold the spirals. Considere (United States patent, 1904) disclosed a reinforcement consisting of longitudinal rods and "independent helicoidal coils of metal * * * surrounding the core and rods," the coils apparently not being attached to the longitudinal members; and the next year published his researches in connection with the use of "continuous helicoidal spirals." In March, 1906, the *Engineer News* published an

illustrated description of metal reinforcement for columns, showing spiral reinforcement retained in place upon the vertical members between projections from the surface thereof.

It is thus apparent that Vandenburgh's invention, at the best, consisted only in the method of attaching the spiral loop to the vertical or spacing member. As already said, his method of attachment was by means of a kerf cut at an angle inclined to the edge of the vertical or spacing member, which thereby created an overhanging spur integral with the upright, the hammering down of this kerf and spur making a rigid connection between the spiral and the upright. It is true that this particular method of attaching the loop to the upright was new as applied to the art of metal-reinforced concrete. But, as already shown, continuous spirals in connection with spacer bars were old in that art. It was old in metal construction generally to use that method of fastening wires to uprights, as shown by Norwood (patent 1896) in the connection of longitudinal parallel wires with the cross-bars of sand-screens, where "diagonal slots forming acute-angle hooks" receive the wires, the hooks being "bent down to hold such wires in place." The same method has been disclosed for the fastening of fence wires to posts of cement construction, the attachment of course not being directly to the cement. We recognize that the use of diagonal kerf and overhanging spur method of connection in a non-analogous art did not anticipate the combination claim in question; but we are not considering anticipation, but invention, and the prior art

in question is thus not irrelevant. *Day* v. *Mountain City Mill Co.* (C. C. A., 6), 264 Fed., 963, 964-5. The adaptation of an inclined kerf and overhanging spur connection to the reinforced concrete art amounted only to a common mechanical expedient. *Berger Mfg. Co.* v. *Trussed Steel Concrete Co.* (C. C. A., 6), 257 Fed., 741.

The defendant does not use the diagonal kerf and overhanging spur. Its coil is located in a rectangular cut in the edge of the upright, there being thus no overhanging spur, and the coil is held in position by hammering or "peening" down the metal at the edges of the rectangular cut sufficiently to hold the coil in position, not rigidly but loosely enough to permit the collapsing of the structure for purposes of shipment. Defendant's method of fastening was also old in the metal construction art, being shown in Prescott & Bennett's 1891 sand-screen patent. The patent in suit has been considered by the Circuit Court of Appeals of the Second and third circuits. In the former (*Vandenburgh* v. *Concrete Steel Co., supra*) claim 3 was held to disclose invention and to be infringed by a construction which seems to be substantially similar to that involved here. In the Third Circuit (*Vandenburgh* v. *Electric Welding Co., supra*) claim 3 was held limited by the prior art to a bar with kerfs in which the attached coil is placed, and a tongue or spur overlapping the kerf and holding the coil in place, and as so limited not infringed by a fastening consisting of a lip or clip struck up from the face of the spacing member.

We are not impressed that the advance in reinforced concrete construction is due in any substantial measure to Vandenburgh's contribution. Our conclusion is that, assuming for the purposes of this opinion that the claim in question involves some measure of invention, it is so narrow as to be practically limited to the specific method of fastening disclosed, and that it cannot be extended to cover defendant's method.

The decree of the district court is accordingly affirmed.

APPENDIX D.

Plaintiff has taken his stand boldly upon the proposition that *all* of the profits which the defendant made from the sales of the alleged infringing structure were due to the patent in suit, and that therefore he was under no duty to apportion or to attempt to apportion between the sale of ironwork for reinforcement of concrete columns made in other ways than by the description of the patent, and that made by the patent formula, on the one hand; nor on the other hand, between column reinforcement made by the formula of the patent, which could not be collapsed, and that which was made like the defendant's structure, which could be collapsed, and was different in that respect. Having thus conceived the case, he has given no evidence on any other theory; and has, as the Master said, made "no attempt" to apportion on either branch of the case. In defendant's opinion, he has therefore failed to prove his case.

This failure is not due to any inherent impossibility, either as to the first class of apportionment, or as to the second. In the evidence in the case, other structures have been shown; and certainly those involved in the cases in the Third Circuit and in the Sixth Circuit have been placed upon the market. At the time of the proceedings before the Master, the structure of the Electric Welding Company in the Third Circuit, an example of which we have before the Court, had been extensively exploited and a

model of it was offered in evidence. No evidence was given of any superiority in construction or saving in cost of the plaintiff's structure over that in the Third Circuit; which, like the defendant's structure, embraced collapsibility; nor was any evidence given concerning the part which collapsibility played in the sales of that structure, save only that its maker, Mr. Cummings, Transcript, page 27, Q. 18, testified that it was a commercial advantage to be able to collapse the structure of his manufacture.

In this situation, therefore, unless the plaintiff can hold the defendant for all of its profits, it is clear that he can recover only nominal damages, and there can be no middle ground.

We think it was clearly his duty to apportion in the way pointed out in *Westinghouse* v. *Wagner*, from which we quote presently.

In the meantime, however, the situation here is not what it was in the *Westinghouse* case. In that case, this Court had not already spoken; and the views which were subsequently expressed, which led to an entire reorganization of the plan of conducting patent accountings, were not available as a guide. For that reason, counsel, not having followed this Court's idea of a proper method, had not given evidence upon which a proper apportionment could be made by the Master. Therefore this Court sent the case back for such evidence. It dragged its slow way along before the Master, Henry H. Denison, who has since become a Circuit Judge in the Sixth Circuit; then before the District Court, which set aside the Master's findings, as it had done before; and quite recently, some two

years after the argument, has again been decided by the Circuit Court of Appeals for the Eighth Circuit, which upset the District Court and affirmed the Master.

None of these difficulties was present in the instant case. *Westinghouse* v. *Wagner* was decided ten years ago. It was thoroughly known to the profession; the rules which it prescribes should have been fully considered and followed in the trial of this case before the Master. Nothing of that was done; if this Court now finds that the case was erroneously decided, upon principles which it has already set out in that leading case, no duty exists to send the case back for further trial, but the reversal must be "on the record in the court below," for good or for bad. It was principally because no previous rulings had been made on this second kind of apportionment (which should have been made in the present case) that the court sent the *Westinghouse case* back; that is, apportionment between the rigid "truss-like structure within the body of concrete" of the plaintiff, which had never been sold and for which there was no demand; and the collapsible structure of the defendant, which has been extensively sold, both in the form in which the defendant makes it and in other forms, as set out in the Third and Sixth Circuits.

We will explain fully the difference between these forms from the working examples present in court; but in order that the explanation shall be in the brief, if the Court shall find it desirable to refer to it, we here state it.

The only form of *column hooping* which the plaintiff sets out in his patent is that shown in Figure 6. It will be noted that the column hooping in that figure, as in Figure 4 and Figure 1 and Figure 3, is "free of the bar" on one side; that is, the helix passes through the slots in the bar on *one side only,* and even in Figure 6, where two different sets of coils are used, four coils in all, none of them is attached to both of the bars. That is because the plaintiff's idea was that one bar would hold the coils, they being so arranged as to be in tension on opposite sides of the center, and so the strains would be balanced and the structure would be stiff, or "rigid".

Defendant's idea was not that. Its helix is continuous in one direction and is attached to one of the bars loosely, upon one side; but a second spacer is also included, and the helix is attached loosely *to that one also,* so that relative longitudinal movement of the two spacers collapses the structure into a flat bundle. When it is put in place in the mold in which the concrete is to be poured, the second spacer is spaced 180° around the cylinder, and holds up the opposite side of the coils. Under some circumstances, additional spacing bars are also used; but obviously if, for example, there be four, two of them may be placed side by side on each side of the coil and it will still be entirely collapsible. When placed in the mold, the spacers may be adjusted to 90 degrees apart. This structure of the defendant, whether used with two or more spacers, is held in position by them while the concrete is being tamped;

the opposite side of the coil is *not* "free of the bar".

The difference is radical. In the one case, plaintiff's structure, if erected in the mold, would have the one side "free of the bar," and could readily be deformed when the concrete is tamped by the heavy ram, so that the strains would not be properly distributed. Having only one spacer, there is no support for the side which is "free of the bar".

On the other hand, the defendant's structure is properly supported at as many points as may be desired. We do not understand how the Circuit Court of Appeals could say that this made no change in the "structure, *qua* structure," Transcript, page 402. The whole mode of operation of the defendant's structure is radically unlike that of the plaintiff. It never at any time purports to be "rigid"; when the spacers are assembled upon it on opposite sides it is as completely collapsible as any coil of wire; yet when placed in the mold, the coils are held in their proper relation so as to support the bursting strain upon the column, as good engineering requires. In the plaintiff's structure one side of the coil being left "free" of any spacer which distributes it properly with reference to strains, there may be open spaces between the coils very much greater than is intended, rendering the column liable to deformation.

THERE IS NO EVIDENCE BEFORE THE COURT AND THERE HAS BEEN NONE AT ANY TIME WHICH SHOWED THAT THE RIGID STRUCTURE WAS SALABLE, AT ANY PRICE, OR ON ANY TERMS.

It is not a case where a defendant has come into a market *which the plaintiff already possessed,* and by making some change in the structure has sought to evade infringement. It is a case in which the plaintiff *never had any market,* and has made no attempt to show that he had. It is a case in which the defendant knew nothing of the plaintiff or of his patent, derived no information from the patent itself or from any structure made under it, but independently devised the thing which it got up, as is stipulated in this case, "without any knowledge of plaintiff's patent or of plaintiff's alleged invention" (Transcript, page 133, folio 398). How then can the Court say that this is a case where the "sale of the article would be impossible without availing of the disclosure of the patent"; as Judge Mayer expresses it, page 402 of the Transcript? "The disclosure of the patent" has never been sold anywhere, by anybody. The lower courts and the Master speak as if defendant had raided the plaintiff's market, and imitated a structure already extensively in use, thus depriving the plaintiff of his advantage; but clearly that is not the situation at all. The entire evidence concerning the exploitation by the plaintiff is found in the deposition of Mr. Griffin, his counsel, page 166 of the Transcript:—

> "I am the only person who has full knowledge of such licenses. I further state that *only one* such license was granted during the time covered by this accounting and it was to the Concrete Steel Products Com-

> pany • • • They had paid for something less than one hundred tons of spirals made in accordance with the invention of the patent in suit. This is the only license of any kind which was granted on or subsequent to the date of reissue of the patent in suit and to and including the date of the filing of the injunction in this case, or the date of the filing of the account."

No description of the trivial manufacture referred to is given; the conclusion that it was like the patent in suit is only that of counsel. That is the extent of the evidence on the subject..

Defendant's structure had long been on the market before *plaintiff was heard of* or his patent was reissued; as the correspondence in Exhibit D (page 125 of the Record) shows, nothing had been done with plaintiff's paper patent except to attempt to drive the trade to taking licenses by such tactics as asserting that structures in use in office buildings built long before were infringements and having the makers of them obtain licenses rather than take a chance on a patent litigation which would cost more, in any event, than the license itself. That sort of tactics will not show utility or be of much avail in this court.

Westinghouse v. Wagner.

The provision of that case under which we believe this one to fall is as follows:

> "(d) But there are many cases in which the plaintiff's patent is only a part of the

machine and creates only a part of the profits. His invention may have been used in combination with *valuable improvements* made, or other patents appropriated by the infringer, and each may have jointly, but unequally, contributed to the profits. In such case, if plaintiff's patent only created a part of the profits, he is only entitled to recover that part of the net gains. He must therefore 'give evidence tending to separate or apportion the defendant's profits and the patentee's damages between the patented feature, and the unpatented features, and such evidence must be reliable and tangible, and not conjectural or speculative; or he must show, by equally reliable and satisfactory evidence, that the profits and damages are to be calculated on the whole machine, for the reason that the entire value of the whole machine, *as a marketable article,* is properly and legally attributable to the patented feature'. *Garretson* v. *Clark,* 111 U. S., 121, 28 L. ed. 371, 4 Sup. Ct. Rep. 291."

Apparently what has misled the Master and the Court below is the fact that the plaintiff *could point to no part of his patent which was new.* The spacing bar was, as we have shown when treating of validity, very old; the helix was equally old; both being shown in the Hyatt patent of 1874, for example, and in better form in the Kieserling German patent of 1892, pages 106 and 107 of the Transcript. The particular form of attachment was old, being shown in minute detail (and indeed very much better than the plaintiff shows it) in the Norwood patent, page 59 of the Transcript. Plaintiff thus

being unable to point to any particular thing which was original with himself, the Master and the courts seem to have reached the conclusion that *therefore* he was entitled to the profits upon the whole structure! We think this is a complete *non constat,* and in the face of the fact that no attempt was made to show any commercial demand for the thing which he actually made, it seems clear that there is no basis for a holding that *any* part of the profits was due to the patent in suit.

Indeed, this would be the conclusion if there had been some novelty in the device itself; because this Court held (*Black* v. *Thorne,* 111 U. S., 121):

> "It does not always follow that because a party may have made an improvement in a machine and obtained a patent for it, another using the improvement and infringing upon a patentee's right will be mulcted in more than nominal damages for the infringement."

This would be to make us pay for "a mere adoption of a well known item of general information" as Judge Manton expresses it in

> *Victor Talking Machine Co.* v. *Star Piano Co.,* 263 F. R., 85.

This Court said in

> *Garretson* v. *Clark,* 111 U. S., 121

that profits and damages are to be calculated on the whole machine when "the entire value

of the whole machine, as a *marketable article*, is properly and legally attributable to the patented feature."

But the course taken by the Court below leads to this curious result; that when there is no "patented feature," but all the features are old and only the combination of them in the patented structure is new, then *Garretson* v. *Clark* does not apply; and there is no way of apportioning profits between what was old in the art and the new combination, but in every such case the entire profit from the sale of the new combination must be attributed to the patent in suit! Yet it is our belief that *Black* v. *Thorne* was intended to apply to just that situation, and where it is impossible to attribute the sales to any particular feature, only the clearest evidence would justify giving all the profits to the plaintiff, and that the defendant should *not* be "mulcted" under such circumstances. This case clearly comes within the leading decision of this Court in

Dobson v. *Hartford Carpet Co.*, 114 U. S., 439

which was followed in another case upon the same patent

Dobson v. *Dornan*, 118 U. S., 10.

The first case is reported below in 10 F. R., 385. The curious part of the decision below in the first case was that the Court took as the standard of profits of the defendant the profit which

the plaintiff made upon the sale of the same article. Of course, that resulted in entire confusion between the question of profits and that of damages, and this Court might have set aside the decision below upon that ground alone. But as in *Westinghouse* v. *Wagner*, it tried to clarify the situation, so that the patent accounting would be correctly conducted thereafter, and took up for consideration the rule which should be followed, saying:—

> "Leaving out of view all questions as to the presumption that the plaintiffs would have made and sold, in addition to the carpets of the patented design which they did make and sell, the infringing carpets which defendant made and sold * * * it is plain that the price per yard allowed as damages was the entire profit to the plaintiffs, per yard, in the manufacture and sale of carpets of the patent design, and *not merely the value which the design contributed* to the carpets. There was no evidence as to that value * * * This Court has, in a series of decisions, laid down rules as to what are to be regarded as 'profits to be accounted for by the defendant' and what as 'actual damages', in suits for the infringement of patents; and no rule has been sanctioned which will allow in the case of a patent for a design * * * the entire profit from the manufacture and sale of the carpets as profits and damages * * * unless it is shown, by reliable evidence, that the entire profit is due to the design. * * * One having a design free to be used and the other a design protected by a patent, the latter may or may not command in the

> market a price larger than the former. If it does, then the increased price may fairly be attributed to the design; and there is a solid basis of evidence for profits or damages. But *short of this*, under the rules established by this Court, there is no such basis."

The Court did not confine this ruling, however, to design cases (as may be contended) because it said immediately afterwards:

> "The same principles are applicable as in patents for inventions. The burden is upon the plaintiff, and if he fails to give the necessary evidence, but resorts instead to inference and conjecture and speculation, he must fail for want of proof."

That is the situation here.

The same question and the same patent came before the court again in *Dobson* v. *Dornan*, and the court affirmed its previous ruling, saying:—

> "The objection is to taking the whole of that profit as a measure of damages on the assumption that the whole of it was due solely to the design."

We cite also the following cases in this Court

> *Seymour* v. *McCormick*, 57 U. S., 490;
> *Mowry* v. *Whitney*, 81 U. S., 620;
> *Gould* v. *Cowing*, 105 U. S., 255.

On the question of the materiality of the order of proof (that is, the burden of proof in general) which this Court has recognized in *West-*

inghouse v. *Wagner* as resting upon the plaintiff, we refer to

Railway Co. v. *Harris,* 247 U. S., 367

where this Court said:

> "These established principles, and our holding in *Central Vermont Railway* v. *White* (238 U. S., 507, 511, 512) we think make it clear that the question of burden of proof is *matter of substance.*"

See also

> *Seaboard Air Line Railway* v. *Horton,* 223 U. S., 492,

which is to the same effect.

The Circuit Court of Appeals was clearly wrong on the accounting.

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Supreme Court of the United States.

CONCRETE STEEL COMPANY, Petitioner, vs. GEORGE E. VANDENBURGH, Respondent.	October Term 1922, No. 237. Oct. Term 1921, No. 674.

BRIEF IN BEHALF OF RESPONDENT.

Statement of the Case.

The matter at bar is a patent case which comes here on a petition for a writ of certiorari, the case below being in the Second Circuit wherein George E. Vandenburgh, the patentee, was the plaintiff and the Concrete Steel Company, the defendant. For the purposes of this case these parties will be designated here as below.

The patent in suit is not an original patent, but is a reissue patent No. 14,182 dated August

15, 1916, and applied for July 1, 1916. The original patent of this reissue was applied for May 9, 1906, was granted January 22, 1907, No. 841,741. The reissue patent is identical as to drawings and specification with this original patent. Claim 3 of the reissue, which is here in suit, is identical with claim 3 of the original patent, except that the word "edge" is substituted for "end". This is a mere clerical correction. Claim 5 of the reissue patent which is here in suit, is identical with claim 5 of the original patent. Claims 1 and 2 of the reissue patent are reductions in scope from claim 1 of the original patent, that claim being broader in scope than the art warranted. This reissue patent has been passed on by three Circuit Courts of Appeals and all of them have held that Claims 1 and 2 are invalid because of a supposed improper expansion of the reissue. Claim 3 has been held valid in all three Circuits, although there is some doubt as to the decision of the Sixth Circuit, as will appear below. Claim 3 has certainly been held valid in the Second and Third Circuits. Claim 5 has been involved in the case at bar and in no other case and its validity has not been questioned by any Appellate Court.

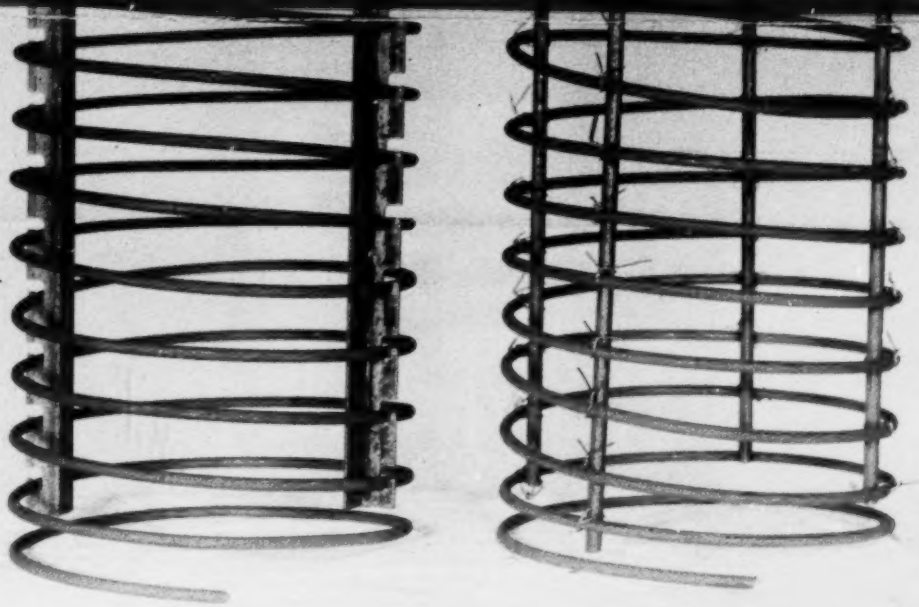
As above stated, the reissue patent in suit has been very much litigated and has been passed upon by three Circuit Courts of Appeals. In the case at bar the patent was held invalid, as to the claims here involved, by Judge Hough, sitting in the Southern District of New York. An appeal was taken by the plaintiff which

affirmed the lower court as to claims 1 and 2 and reversed it as to claims 3 and 5. The opinion of Judge Hough is found in the record at page 134 and the opinion of the Circuit Court of Appeals, is found at 258 F. R. 143, and in the record at page 150. These and other opinions on this patent are quoted in petitioner's brief. An accounting was had after the decision of the Circuit Court of Appeals which has resulted in a recovery by the plaintiff of profits in the sum of $15,918.33. No damages were allowed, the Master, the District Court and the Circuit Court of Appeals, all being in full agreement. This decision is found at 278 F. R. 607 and at page 397 of the record. The Master's report is found at page 314.

In the Third Circuit a suit was brought by this plaintiff against the Electric Welding Co., the first opinion being rendered by Judge Orr, sitting in the Western District of Pennsylvania, who held the patent invalid as to claim 1, and probably as to claim 3, but if this claim is valid, it is not infringed, and in any event he held that the bill should be dismissed. On appeal, the Circuit Court of Appeals for the Third Circuit held that the patent was valid, but not infringed, as to claim 3 and invalid as to claims 1 and 2. A petition for a writ of certiorari was filed in this Court in this case and denied (253 U. S. 497). In the Third Circuit the decision of the lower Court was affirmed. The opinions of the District and the Circuit Courts of Appeals are found at 259 F. R. 579 and 263 F. R. 55.

In the Sixth Circuit suit was brought by this plaintiff against the Truscon Steel Co. and there the lower Court passed on claims 1 and 3, which were the only claims in suit. The Learned Court held both claims to be invalid or if valid, not infringed. On appeal the lower Court was affirmed and the Court said as to claim 3: "It is true that this particular method of attaching the loop to the upright was new as applied to the art of metal reinforced concrete. We recognize that the use of diagonal kerf and overhanging spur method of connection in a non-analogous art did not anticipate the combination claim in question." It held claim 1 invalid and whether it held claim 3 invalid or valid makes no difference. For the purpose of this brief, we will hold that this Court held the claim valid, but not infringed, but lay no stress on the matter as it is immaterial either way. (These opinions appear in the companion case, No. 273.)

The defendant's structure in the case at bar is identical with the structure of the patent in suit and with claims 3 and 5, so that no question of infringement can be seriously urged here. If the patent is valid, it is infringed.



PATENTED STRUCTURE

Coils locked to bars by hammer blows.
Spacing maintained when concrete is poured and tamped

PRIOR STRUCTURE

Coils held to bars by wires
Even spacing impossible when concrete is poured and tamped

The Invention.

The nature of the invention of the patent in suit can be readily determined, insofar as here relevant, from Figure 4 of this patent. As commercially used, it is shown in a structure which is illustrated in the accompanying photographs. Note that there are four elements, to wit, a coil, a bar, a kerf and an overhanging spur which is bent down by a hammer blow so as to imprison the coil in the kerf. This photograph also shows the only prior art structure which had any considerable use to speak of. A description of this kind of structure is found in the record beginning with page 200. The paper art we will consider below which is the art relied upon by the defendants. The prior art which the plaintiff relied upon for the purposes of the accounting is shown at the right of the photograph. In this prior art structure appears a coil and a bar, but the coil is secured to the bar by means of a wired loop, of hair pin shape, which is passed about the bar of the coil and then twisted in a simple and obvious manner. The patented structure differs from the prior are structure in the use of an overlapping spur and a kerf. The overlapping spur and kerf keep the coil so that it is evenly spaced and rigidly held when the reinforcing is surrounded by concrete and it is rigidly held even though the concrete be tamped or otherwise worked into position. With the wired structure, the spacing is necessarily uneven be-

cause the coils will not lie true and slide on the bars and one irregularity necessitates another so that it is impossible to get regular spacing. There is an obvious difference in the time necessary to erect these two structures. The patented structure is erected in a very few minutes by means of hammer blows given at the proper time and place and while the coil is held in position. The wired structure requires a great many manipulations incidental to the placing and twisting of the wire and so takes many more minutes, say three or four times as long to erect.

The Court may ask for citations as to when this wired structure first went into use and to what extent it has been used. The record does not say when this wired structure first went into use. The engineering text books give citations which show this use to have been at least as early as 1893. (See page 21 of this brief where the matter is discussed at length). For additional citations in the record where this is referred to, we call attention to the testimony of Robert A. Cummings, page 28 Q28 of the transcript and also the testimony of Julius Kahn page 29 Q4. This answer taken in connection with his answer to question 1 indicates that he designed thousands of buildings, many of which must have used this wired structure.

A great many pages of the defendant's brief is devoted to what seemed to us to be entirely immaterial matter. The patent in suit shows two structures and also has claims which relate to two different structures. It has one set of claims which are broad enough to cover

both sets of structures and one set of claims limited to one structure. These sets of structures can be designated as the horizontal and vertical. The horizontal structure relates to lintles, sills and other structures which lie horizontally when in place. The other embodiment of the invention is for columns which stand vertically. With the specific claims and the horizontal construction, this Court has nothing to do. All the matter relating specifically to horizontal structures may be ignored and considered out of the case. The defendant does not use such a structure and none of the claims which are restricted to this horizontal structure are involved in this suit. Therefore, we will not consider the irrelevant matter of the defendant's brief, but confine ourselves to the reinforce for columns in which we are interested. The only reinforce that requires our particular attention is one involving the structure of Figure 4 in one embodiment and in Figure 6 in another embodiment, although for the purposes of this case, we may ignore Figure 6, as it is rather complicated and has two coils where one will suffice, and confine our attention to the structure of Figure 4. Here are clearly disclosed the four elements we have cited above, namely, the *bar*, the *coil*, the *kerf* and the *overhanging spur*. In claim 5, the kerfs are defined as "disposed diagonally to the length of the bar", and the overhanging spurs are defined "as projected toward the center of the bar". The term "center of the bar" means midway between the ends. In Figure 1 these spurs extend in opposite directions and if pro-

jected will run into a line perpendicular to the bar and passing through its geometrical center. In Figure 4 the spurs all stand one way so that a line drawn through the axis of these spurs, if projected far enough, will intersect this same line drawn perpendicular to the center of the bar. If the Court takes another view of the case and says that the center of the bar is the longitudinal axis of the bar, a line drawn through the axis of these spurs will also intersect this center line and in both cases it will intersect it diagonally.

We explain this point a little because the defendant, in its brief, takes the position that claim 5 must be limited to a structure wherein the kerf and spurs project in two opposite directions, as shown in Figure 1 and under this contruction claim 5 should be limited to what is set forth in Figure 1 and as the defendant does not use this structure, but uses the structure of Figure 4 the claim is met that there is no infringement. By comparing claims 4 and 5 we find that the defendant seeks to give an artificial construction to claim 5 which will make it identical in scope with claim 4. This is absurd. Claim 4 covers the horizontal bar of Figure 1 with the oppositely disposed coils and claim 5 is limited so as to cover a coil extending in one direction only and applies either to Figure 4 or Figure 6.

The patent in suit on its face is not limited to the horizontal structure only. Beginning with line 16 of page 1, transcript of record page 49, it appears that the patent sets forth what we have designated as the horizontal bar

as one object of the invention and then goes on to say beginning with line 25 that there are other objects as thereinafter set forth, and in Figure 6 reference is made to a column construction which is amplified in the paragraph beginning with line 89 and on the following page, 50 of the transcript of record, it is stated that the invention is for use in connection with columns or elsewhere where it is suitable.

The defendant urges that a coil secured to a bar as directed in the patent cannot be collapsed. The plaintiff alleges that it is impossible to make a coil, as shown in Figure 4, that cannot be collapsed. Nothing has ever been presented by any party in Court which cannot be readily collapsed. Collapsibility is a mere incident which is not mentioned in the patent in suit. As pointed out below, when the reinforce is in place and embedded in the concrete where it is used, it is rigid and cannot be collapsed under any circumstances. The possibility of collapsing is one which may be of use in transportation under certain circumstances, but in any event this is a minor feature which is of no great consequence one way or the other.

The defendant's brief devotes a great deal of attention to irrelevant matter which we do not think it necessary to answer specifically. We prefer to argue the case on its merits in a clear, simple, concise way and debate what we believe to be the real issues in the case.

Then is another aspect of this invention on which we comment briefly.

This invention is the product of the hand and brain of a bricklayer. It is not the prod-

uct of a well equipped factory. The embodiment shown is crude, but it contains the correct idea. It has the (1) coil, (2) bar, (3) kerf and (4) overhanging spur. These never appeared together in the art before. Here they are crudely but sufficiently shown and claimed.

Throughout the defendant's brief, we find a determined effort to create a prejudice against this patent because of this crudeness. A comparison is had with the defendant's structure, the product of an expensive and well equipped factory which product embodies the same elements, in the same combination which obtain the same result and function the same. It is implied that there is no infringement because of this refinement of detail.

This is a new doctrine of law. If sound it might have been used to defeat the great epoch making inventions of the world. The first telephone was crude but it embodied the right idea and the same is true of the first telegraph, the first phonograph, the first steam boat, the first locomotive, the first wireless apparatus, the first sewing machine, the first flying machine, and so on through a long list, they one and all were crude when first made, but who thought the less of them on that account? What basic patent was ever defeated for this reason?

Undoubtedly, the principal issue in this case is the issue of validity of claims 3 and 5, and if the Court decides that in favor of the defendant, it will be successful and there is nothing to plaintiff's case. If, on the other hand, this issue be decided in favor of the plaintiff,

there will be minor issues to decide, such as the validity of claims 1 and 2 of the reissue, the question of damages and the question of profits. This brief will be addressed to the four issues, beginning with the validity of reissue claims 1 and 2 and following with the validity of the patent and particularly claims 3 and 5 and following with a discussion of damages and profits.

POINT I.

The patent in suit is a proper reissue.

There can be no question as to the validity of claims 3 and 5 as far as the reissue is concerned. No Court has disputed that. They may be invalid as to the prior art, but they are not in any way affected by the question of reissue. Verbal correction was necessary in claim 3 and such verbal correction can be made. (*Gage* v. *Herring*, 107 U. S. 640). This brings us to a consideration of claims 1 and 2.

It is contended on behalf of the plaintiff, that claims 1 and 2 of the reissue are nothing more or less than claim 1 of the original patent put in proper form and narrowed and restricted so as to properly define the plaintiff's invention. If this be true, the delay of nearly ten years in applying for a reissue is immaterial and time in no way enters into the matter. *Abercrombie* vs. *Baldwin*, 245 U. S. 198. For the convenience of the Court, claim 1 of the original patent and claim 1 of the reissue are set down in parallel columns, spaced so as to show cor-

responding elements, with remarks interpolated between.

Original Claim 1	Reissue Claim 1
In	A concrete reinforcing consisting of

(The difference between the introductory clauses is immaterial.)

a reinforcing bar	a bar having a plurality of integral spurs

(The reissue claim is more more limited as to the bar.)

a spiral coil rigidly secured secured thereto at two points in each convolution thereof	and a spiral coil permanently secured thereto by having the spurs bent down on the several coils

(Disregarding the words "rigidly" and "permanently", which will be considered below, the coil and its securing means are much more limited in the reissue than in the orignal claim.)

and extended beyond and free of said bar at the opposite side therefrom to the securing point	the coils extending beyond and free of said bar at the opposite side therefrom to the securing point

(These last clauses are substantially identical).

The only matter to be considered in this connection is the second element and its holding means, that is, the spiral coil and its connections, which the original claim, are defined as "rigidly secured thereto at two points in one convolution", and in the reissue claim they are defined as "permanently secured thereto by having the spurs bent down".

The language of the reissue claim is taken from lines 85 to 88 inclusive of page 1 of the patent in suit.

What is the meaning of these terms "rigidly secured" and "permanently secured" as here used? Let us consult a recognized authority. The word "rigidly" is defined in the Century Dictionary as follows:

> "In a rigid manner. Stiffly, inpliantly, inflexibly."

It is not defined in any book as *immovable* and in mechanics there is no such thing.

Turning to the definition of "permanently" we found the following in the Century Dictionary:

> "In a permanent or lasting manner; so as to remain; as, to serve permanently; to settle permanently."

And the word "permanent" is defined as follows:

> "Lasting or intended to last indefinitely, fixed or enduring in character, condition, state, position, occupation, use or the like;

> remaining or intended to remain unchanged or unremoved; not temporary or subject to change; abiding; as, a *permanent* building; *permanent* colors, *permanent* employment, *permanent* possession."

Is there any great difference between these two words "permanently" and "rigid" as employed here? A rigid structure is one which does not change its state under the conditions of use. A permanent structure is one that does not change its state under the conditions of use. The spiral reinforcing as set forth in the claims does not change its state under the conditions of use. That is one reason for its great value. It is precisely this feature, which in addition to the ease with which it can be assembled, distinguishes it from the wired structure which is shifted and changed during the process of pouring and tamping the column in which the reinforcing is placed and is assembled with expense and difficulties.

It is true that another advantage is that the spiral reinforcing of the claims can be shipped with greater facility than the wired structure because it can collapse, as a parallel ruler is collapsed, and it is altogether probable that this property was not known or appreciated by the inventor of the patent in suit at the time he made his invention, but this is a mere incident of the construction. Assuming this to be the case, what of it? This matter has often come before this Court and always received one treatment and one answer. It is well set forth in the *Grant Tire*

case 220 U. S. 428, 31 Sup. Court Rep. 447 where the properties of the Grant tire were not in the least appreciated by the inventor at the time he took out his patent. There the Court found as follows:

> "A patentee may be baldly empirical, seeing nothing beyond his experiments and the result; yet if he has added a new and valuable article to the world's utilities, he is entitled to the rank and protection of an inventor. And how can it take from his merit that he may not know all of the forces which he has brought into operation? It is certainly not necessary that he understand or be able to state the scientific principles underlying his invention, and it is immaterial whether he can stand a successful examination as to the speculative ideas involved." *Diamond Rubber Co.* v. *Consolidated Rubber Tire Co.,* 220 U. S. 428, 31 Sup. Court 444, 447.

Furthermore, this advantage in shipment is of small consequence because the Labor Unions generally require job erection and not shop erection, for example, as around the City of New York. This matter was commented upon and considered by the Court below and appears in the testimony of Barbour, defendant's witness who was produced at the request of the plaintiff in answer to questions 41 to 44 inclusive. (Record page 173.)

Now summarizing this matter, we find that the first element, "the bar" is much broader in the original claim than in the reissue claim and

that the spiral in the original claim is set forth as an impossible structure which is rigidly secured to the bar at *two points* in each convolution while the reissue claim covers the coil as secured by the spurs being bent down on the several convolutions of the spiral and thereby corrects the impossibility of the first claim. This impossibility is a clerical error which was corrected in the reissue. No one has deemed this point worth talking about. The difference between "permanently" and "rigidly" is not worth further consideration. Obviously, the claim 1 of the reissue is much more specific than claim 1 of the original patent.

It is not necessary to consider claim 2 because it is substantially identical with claim 1 differing in using *"integral means"* where claim 1 uses "integral spurs". As "means" and "spurs" are one and the same thing, both in the patent and in the defendant's structure, discussion is superflous.

We appreciate that the three decisions of the three Circuit Courts of Appeals and of the lower Courts are all against the plaintiff. They all go off on a tangent which is well set forth in the decision of the Circuit Courts of Appeals in the Second Circuit which reads as follows:

> "Both Courts held that the original patent did not contemplate collapsibility of the structure because the spiral coil was described as rigidly fixed by kerfs and spurs on the reinforcing bar. For this reason, it was held that claims 1 and 2 of the reissue

which were intended to cover collapsibility of the structure were invalid as too broad. We agree in this conclusion."

We have already pointed out above that *as used* the coil and bar of the patented structure and of the defendant's structure are just as *rigidly fixed together as possible. Rigidity is the essence of this invention, once the structure goes into use.* That is why the city codes call for this invention. (Rec. p. 200, fol. 132.) What it is before it is used is immaterial. It may be in separate parts, the coils and the bars being shipped to the job separately, or it may be erected in the shop and sent to the job, in either an erect or collapsed condition. Whatever happens in this regard in no way changes the nature of the invention of the patent in suit.

In spite of what all the Courts have said against us, we contend that these lower Courts are all in error because they disregarded plain and obvious facts, and the reissue is right and proper and has simply corrected an obvious clerical error in the claim, and made the first two claims much more restricted, to-wit, restricted as to spurs, as to the way the spurs hold the spiral, and as to the material from which the spurs shall be made, three definite restrictions not found in the original claims.

We have already pointed out that this matter of reissue is a minor point because the plaintiff must win if he establishes claim 3 and is successful as to that, and claim 3 is the same in substance that it was in the original patent and all

Courts have so held and held that this claim has the force and effect it would have had, as far as infringement is concerned, had no reissue patent been taken out. This is amply supported by the authorities and particularly *Gage* v. *Herring,* 106 U. S. 640.

The defendant devotes many pages to this matter of reissue, namely pages 49 to 76 of its brief. Throughout this portion of its brief, the defendant assumes that claims 1 and 2 have been broadened in the reissue. This is not the case. The reissue claims are more specific than the original claims and they are limited to the details of construction which the patent shows. Take claim 1, for example. As originally drawn, it was broader in that the spiral coil was defined "as rigidly secured" to the bar. Now it is defined "as permanently secured by integral spurs". Obviously, this is a narrowing and not a broadening and the authorities cited by the defendant have no bearing and its argument is immaterial and irrelevant.

POINT II.

The patent in suit is valid as to the four claims here involved, namely claims 1, 2, 3 and 5.

In this connection we note that this Court may hold that claims 1 and 2 are invalid because of the reissue matter. Should the Court so hold, claims 3 and 5 are still good as far as the reissue is concerned and they completely

cover the situation here at bar and amply support the judgment of record and any other judgment that the plaintiff may obtain. However, as the plaintiff believes he is entitled to all the claims in issue and as the reissue matter has been argued elsewhere, he will stand on the proposition that all these claims are valid, although he now particularly directs his attention to claims 3 and 5.

The question of invention in this case as in all cases, where the issue is involved, "depends on the state of the prior art and the skill of the calling." If the state of the art and the skill of the calling were adequate to produce the alleged invention of the patent in suit, there was no patentable structure and the patent is invalid. If, on the other hand, the history of the art clearly shows that although the invention of the patent in suit was badly needed, and the skill of the calling was insufficient to produce it until the disclosure of this patent gave it to the world, then, under these circumstances, the presumption of invention is strong, if not conclusive.

That the structure of the patent in suit is valuable goes without saying, and its utility cannot be disputed by a defendant who has foresaken the prior art and clung to the patented structure with a profit of at least $16,000 to itself. Looking a little further into the matter, the necessity of the invention becomes apparent. It must be used because it is cheap and because it is efficient and, because the building codes of the country now require that character of strucutre. With nothing that was used

in the prior art can one be sure that the coil is properly placed with even spacing in the column where it is used. This is most important. A column is reinforced for the same purpose that a barrel is hooped. If a barrel fails under pressure it is because the hoops burst. If a column of this kind fails under pressure it is because the reinforcing bursts and ceases to function. If the coils are not evenly spaced, the column is weakest and most liable to fracture where the spacing is greatest and as the reinforcing is placed where it is invisible and cannot be inspected, such a weakness is not apparent until the failure comes. In fact engineers consider a structure as in a "failed" condition if a hoop is misplaced even if the column does not fall down. From this it appears that the patented structure is always desirable and always has been desirable wherever spiral reinforcing has been employed, but while it was desirable it did not come.

The record does not show just when spiral reinforcing was first used but this is not important as it is quite proper and competent for this Court to turn to recognized text books to see what they have to say on the subject. We call the attention of this Court to one of such books, namely, "Reinforced Concrete" by Buell & Hill, published by the McGraw—Hill Book Company in 1906 and copyrighted in that year and in the year 1904. From this book we could cite many examples of spiral reinforcing which is used in pipes, tanks, chimneys and the like, all of which have been in use for years prior to the date of publication and

have been used the world over. One quotation of such a use is quoted from page 295 where a spiral and reinforcing is shown in Figure 152, which is not reproduced here because the description is sufficient without it.

> "Water-works, Conduit, Bone, Algeria.—An example of the use of reinforced-concrete conduit molded in sections and subsequently laid is furnished by the aqueduct built in 1893 to supply the City of Bone, Algeria, with water. This aqueduct is about 22 miles long and about 2 ft. in diameter, and is of the so-called siderocement construction invention by the French engineer Bordenave. Fig. 152 shows the form of reinforcement employed by this engineer. It consists of T bars wound in helical form around longitudinal parallel bars of the same section, the two sets of bars being connected at intersections by wire ties. This reinforcement is embedded in a Portland-cement and sand mortar."

Now it may be urged that it is not proper for the Court to look into text-books to satisfy itself as to the history of an art. This matter has been expressly passed upon by this Court and the contrary view has been held (*Werk* v. *Parker*, 249 U. S. 190, 39 Sup. Ct. 197) where this Court stated as follows:

> "Nor is it questioned—indeed, we deem it clear, beyond question—that the court was justified in taking judicial notice of facts that appeared so abundantly from

standard works accessible in every considerable library. *Brown* v. *Piper,* 91 U. S. 37, 42, 23 L. Ed. 200; *Terhune* v. *Phillips,* 99 U. S. 592, 25 L. Ed. 293."

From the foregoing this Court will assume that longitudinals were wired to spirals for at least thirteen years prior to the date of the patent in suit. It is admitted that the structure of the patent in suit was new with the patent in concrete reinforcing. All the lower Courts admitted this. The decisions find the elements, but not the patented combination of elements.

The nearest approach seems to be the wired structure which has already been considered. This was in the prior art and was used. The other art is substantially a *paper art* and none of it shows anything that was used to any extent or could be so used. A few structures of this paper art had a slight use but no general recognition and were soon abandoned. The wired spiral longitudinal structures was in common use for at least 13 years before the patent. Why the immediate change upon the appearance of the patented structure? Why is it that the defendant had never used any of the structures of any of the paper patents upon which it relies? As we consider these paper patents, it will appear that the defendant did not use them because it could not use them.

Beginning with page 40 of the defendant's brief appears a reference to a number of drawings. These remarkable drawings seem to be partial structures taken from many arts to show many things under misleading titles. It is unnecessary to look at them if the purpose

is to show that the elements of the patent in suit are all old in other arts. This is admitted. Coils are old, bars are old, kerfs are old and so are overhanging spurs. *However, it must be admitted and cannot be denied that never before have these four elements been combined in any reinforce for concrete so that a coil was evenly spaced and rigidly held when the concrete was poured and tamped so that the user could be obsolutely certain that his reinforce was in place when the job was done and one part of his column is just as strong as another part and there is no unevenness in the reinforce.* This combination of cooperating elements which are positively included in the claims in suit cannot be met by showing drawings of the elements in various arts and various places. It cannot be made by showing subseqeunt patents for the same thing or different things.

These remarks seem to dispose of all defences based on drawings 1, 2 and 3.

Now turning to drawing No. 4 the British Hyatt patent of 1874, it is alleged that the helical coil is attached to the spacer by a rivet. This is an impossible structure.

The Kieserling German patent of 1892 forms the subject matter of drawing No. 5 and it is claimed that Figure 7c shows the structure of the Truscon Co. in the companion case No. 273. This is not true. In this Figure 7c the coil lies in a notch with nothing to hold it there and the structure is not practical or feasible for this reason. To be practical the coil must be rigidly and permanently held in place so that it cannot be forced out by tamping. A patent which lacks an essential element, to wit, the *overhang-*

ing spur cannot be an anticipation. This seems to be recognized by the defendant who alleges that other structures show the overhanging spurs. It is true that the other structures do show overhanging spurs, but what of it? We have already admitted that the elements are old, but no one was able to combine them into the structure of the patent in suit until this inventor did so.

Drawings 6, 7, 8, 9 and 10 merit slight attention. A fence post does not show the solution of the problem of *keeping the reinforce in proper alinement when the concrete is poured and temped, nor does a sand screen.* All these patents show elements, but none of them show the combination of the patent in suit and none of them show a device capable of functioning as does the patented device.

Drawing 11 shows the Considere patent. Considere shows a spiral and he shows longitudinals, but he shows *nothing for holding the spiral to a longitudinal* and spacing the same while the concrete is poured and tamped. This idea is entirely foreign to his thought. He was designing cables and towers. He had two elements of the patented combination, but got no further. He did not know how to hold the convolutions of the coils in right relation and firmly, although he was an exceedingly gifted and clever engineer. *It is contended that drawing No.* 11 *is exceedingly persuasive in favor of the plaintiff.* Here was a very gifted man, an able man, working in the prior art. He knew what was required and yet he did not know the solution of the problem incidental to meeting the requirements. At this late date, it looks as if

he should have known. This is because "knowledge after the event is always easy".

Drawing No. 12 is said to show the Cummings structure. Cummings used no spirals until on and after 1907. (Transcript of record page 28 Q27.) He knew how to hold *hoops in various ways,* but he knew nothing about *spirals.* Obviously, he did not know how to solve the problem of securing spirals in place prior to the patent in suit, or he would have done so. He was in the business and could have used the spirals had he known how.

We recognize that the Cummings structures of one kind and another were involved in the Pittsburgh case which is not before this Court. We are not arguing this Pittsburgh case at this time. We will not fall into the error of our opponents of assuming that the structure of this Pittsburgh case, which went to the Circuit Court of Appeals for the Third Circuit, is free and clear of the patent in suit. It may be or it may not be. The Circuit Court of Appeals for the Third Circuit has held that it is. This Court may take a different view. The statement in the brief is misleading as to the date. The date of the use of spirals is not 1905, but after 1907, that is after the filing date of the patent in suit and not before.

Drawing No. 13 shows subsequent art. We never heard of a patent being defeated by subsequent art. How does the Court know that McClure never saw the structure of Vandenburgh prior to the filing of his application? McClure was not called as a witness and so this Court cannot say whether or not he was independent of Vandenburgh, and the matter is

not before it. The same argument applies to Barnes who took out a patent for an altogether different thing. He may or may not have had knowledge of Vandenburgh's prior structure which was made in 1903 and in continuous existence thereafter until the date of its destruction. See the deposition of Vandenburgh and Blethyn beginning with page 18 of the transcript of record for Vandenburgh and page 32 for Blethyn. Under drawing No. 13 the defendant asked if it amounts to invention to do what Vandenburgh did and what the defendant did. Speaking as of the date of Vandenburgh's invention, we answer yes, most emphatically yes. If it were obvious to make the invention of Vandenburgh why was it not made earlier? Wired structures were used at least as early as 1893, some ten years before Vandenburgh and the art was crowded and the need great, and yet no one was able to satisfy the need. Once the invention was made and published to the world, it went into universal use and is still in universal use and it has put the old forms out of existence. These facts are very persuasive.

The defendant talks about an interference. How can there be an interference? There can be an interference when two parties claim the same thing at the same time in the Patent Office of the United States. Neither McClure nor any of the others claimed what Vandenburgh claimed, nor claimed anything like what Vandenburgh claimed. Barnes does not even show a spiral in the form of a hoop, but merely shows a bar which is bent zig zag back and forth. This is clearly irrelevant. McClure claims a narrow web or fin extending from an edge of a bar No such structure is in Vandenburgh.

Drawing No. 14 is supposed to show the Vandenburgh reissue and is not set forth as an anticipation.

None of the patents cited and relied upon by the defendant, in any way anticipate the invention of the patent in suit. These anticipations, insofar as they are relevant, show the poverty of the art and the inability of those skilled in the prior art to make the invention of the patent in suit. This paper art is much more persuasive in favor of the plaintiff than it is in favor of the defendant.

The sand screen patents and the fence post patents are certainly immaterial and irrelevant under *Potts* v. *Creager* 155 U. S. 597. The other patents, such as the Kieserling patent and the Considere patent and the Hyatt patent show spirals and they show bars, but no integral spurs are shown for holding the spirals to the bars by integral spurs and kerfs. This idea is entirely foreign to these patents and they are therefore entirely irrelevant under the decisions of this Court rendered in the cases of *Hobbs* v. *Beach* 180 U. S. 383 and *Toplif* v. *Toplif* 145 U. S. 156.

We consider the reinforcing patents from another point of view. Turning to these concrete reinforcing patents we may take the Kieserling German patent as the nearest and therefore the only patent which we need consider. This Kieserling patent is to the patent in suit what the prior art was to the Grant patent in suit in this Court in the case of *Diamond Rubber Co. of New York* v. *Consolidated Rubber Tire Co.*, 220 U. S. 428, The Grant patent, this Court will recollect, differed from the prior art in that a groove

was flared so that a tire could creep and thereby obtained a result not obtained in the prior art, to wit, longevity and in a new way, to wit, by creeping. In the case at bar the patent in suit secures a new result, to wit, the regular and fixed spacing of the coils when in use in concrete, thereby making a column of uniform strength throughout and it does so by clinching the coils in the notches by means of the overhanging spurs. This extreme rigidity and permanency has given to the structure of the patent in suit a use which is universal and now insisted upon by the building codes of various cities, as above pointed out. It is submitted that the same reasoning which sustained the validity of the grant patent must sustain the validity of the patent here in suit.

What this Court has said elsewhere, as to unsuccessful prior art applies here.

> "Likeness in them, in physical structure, to the apparatus of Richardson in important particulars, may be pointed out, but it is only as the anatomy of a corpse resembles that of a living being. The prior structures never effected the kind of result attained by Richardson's apparatus, because they lack the thing which gave success . . . . . Taught by Richardson and by the use of his apparatus, it is not difficult for skilled mechanics to take the prior structures and so arrange and use them as to produce more or less of the beneficial results first made known by Richardson; but, prior to 1866, though these old patents and their descriptions were accessible, no valve was made,

producing any such results." *Consolidated Safety Valve Co.* v. *Crosby Steam Gage & Valve Co.*, 113 U. S. 157, 5 Sup. Ct. 513, 521.

It is contended that under such circumstances this Court will assume that the structure, which was published by this patent, was beyond the skill of the calling and beyond the prior state of the art and involved invention and that the claims here in suit are valid and particularly claims 3 and 5 which are free of all adverse influences due to the reissue.

POINT III.

Damages should be allowed the plaintiff as to the 727 tons not covered in the accounting.

In the record in the Court of Appeals there were fifty pages of figures which were stipulated into the record and not in any way disputed on which the Master based his finding. It is thought by counsel for both sides that the Master summarized these figures sufficiently for the purpose of this Court and therefore by agreement, fifty pages were eliminated from the record as unnecessary, both sides agreeing to take the Master's summaries. There were a great many transactions, some of which were profitable and some of which were unprofitable. The transactions which were profitable aggregated 1,684 tons and the transactions which were not profitable aggregated 727 tons, the total tonnage sold being 2,411 tons.

The plaintiff never sold any spirals or manufactured them and it is not believed or contended in his behalf that he established a royalty. He therefore relies on a reasonable royalty which should be determined from all the facts and circumstances of the case, as set forth by this Court in the *Dowagiac case* 235 U. S. 641, 35 Sup. Ct. 221.

Now it appears from the testimony of the defendant's witness Webber, beginning with Q5 page 243 of the record, that the patented structure cost $4.88 a ton to assemble and that the new wired structure used by the defendant when put under injunction cost $5.62 a ton or 74c a ton more than the patented structure. Certainly this saving should be allowed as a reasonable royalty which is *at least 74c a ton*, and this should be allowed on the showing made by the defendant.

Furthermore, another of defendant's witnesses, one Lewellyn, stated in answer to question 9 page 257 of the record that the sale of spirals is frequently unprofitable in itself, but merely serves to assist in the sale of other concrete reinforcement. This indicates that the invention has value, whether a profit is made from its sale or not and is persuasive to the effect that a royalty should be paid.

In this connection, we call the attention of the Court to the fact that the defendant sold 1,684 tons of infringing spirals and made a profit of substantially $19,000 or a little more than $11 a ton, on an average.

Two witnesses, White and Thayer have been called by the plaintiff, and they have shown that the patented structure causes a great sav-

ing over the wiring structure of the prior art, White saying that $36 a ton for the particular column he considered (record pages 47 and 48) and Thayer, $10 a ton (record page 65 question 26). Both Thayer and White compared the patented bar and spiral which were the only commercial devices open to the defendant at the time of the infringement and upon considering the conditions, these experts estimated $12 and $8 a ton as reasonable royalties. Where the plaintiff made agreements, without regard to litigation, he agreed to accept $3.00 a ton. The defendant could well afford to pay $5 a ton to get and hold the business.

Taking all matters into consideration, the plaintiff submits that $5 a ton is a reasonable royalty and should be allowed by this Court. This will total $3,635 if this Court takes this view.

POINT IV.

Profits should be allowed as to the 1884 tons without reduction for alleged interest on the estimated investment and with interest as to each transaction from this date.

The Master found at page 215, fol. 645 of the record that the defendant's statements, as finally amended, were made up of many items as to some of which there was a profit and on others a loss and the profitable items aggregate $18,982.13. From this the Master deducted $3,063.80 interest on the investment, a matter

which will be explained below, leaving a net profit in favor of the plaintiff of $15,918.33. This recovery is based on 1,684 tons as to which there was a profit. This sum of $15,918.33 which the Master has allowed, as well as the two lower Courts, is certainly allowable beyond all reasonable dispute under the *Westinghouse* v. *Wagner* case 225 U. S. 604, paragraphs a and b, either or both. These paragraphs read as follows:

> "(a) Where the infringer has sold or used a patented article, the plaintiff is entitled to recover all of the profits."
>
> "(b) Where a patent, though using old elements, gives the entire value to the combination, the plaintiff is entitled to recover all of the profits. *Hurlbut* v. *Schillinger*, 130 U. S. 472, 32 L. ed. 1016, 9 Sup. Ct. Rep. 584."

The defendant argues at great length beginning with page 93 of its brief as to the accounting. The entire argument seems to be based upon a misconception of the facts of the case at bar. The patented structure, as we have pointed out above, has four elements, namely, a coil, a bar, a notch and an overhanging spur. The entire value of the combination is what has been appropriated by the defendant. Therefore, there is no occasion to segregate what belongs to the patent and what does not belong to the patent. The case comes squarely within the first paragraph of *Westinghouse* v. *Wagner*, known as paragraph "a" and it also comes within paragraph "b", as we have just pointed

out. It does not come within the other paragraphs wherein a peculiar value is due to improvements of the prior art or to improvements of the defendant which are open to it as of the date of infringement. No effort was therefore made in at any apportionment and none was necessary, the plaintiff being entitled to the entire profit and this he was allowed.

Take any of the elements of the defendant's structure or of the patented structure out of combination and there is nothing left. The combination is everything or it is nothing. If the combination be nothing, the case will fail on the ground of want of patentable novelty in the patent in suit, but if this patentable novelty be admitted, the decision will stand and the accounting is good, the figures being actually based on what was not in dispute and on what was submitted by the defendant's own expert accountant.

There is one matter which should be called to the attention of the Court. Beginning with the second paragraph of page 97 of the defendant's brief appears an argument based on the assumption that collapsibility is a matter of value and that this was not considered by the Master, etc.

It is thought that the defendant at this late hour cannot argue this point because the exception was not raised before the Master. It was urged for the first time in the Court of Appeals. This is too late.

> "It was urged in the argument in this Court that the defendants are jointly and severally liable, inasmuch as the Stearns

Company manufactured the machines and the Typewriter Inspection Company sold them. The objection thus raised in this Court was not suggested to the Master, and is not included among the exceptions taken to his report, although it is stated in the assignment of errors filed to the Court's decree that error was committed by the Court in failing to find that the defendants were jointly infringers and are jointly liable. Counsel must be aware that the proper practice requires that no exceptions to a Master's report can be raised in this court which were not taken before the Master. The rule is an old and well-established one. In *Story* v. *Livingston*, 13 Pet. 359, 366, 10 L., Ed. 200, the Supreme Court in 1839 declared that in chancery practice no exceptions to a Master's report could be made which were not taken before the Master, and that the object of the rule was to save time, and to give him an opportunity to correct his errors or re-consider his opinion. Such had long been the English rule, and the Federal Courts have always adhered to it. See *McMicken* v. *Perin* 18 How. 507, 15 L. Ed. 504 (1855); *Topliff* v. *Topliff*, 145 U. S. 156, 173, 12 Sup. Ct. 825, 36 L. Ed. 658 (1892)." *Underwood* v. *Stearns* 227 Fed. 74, 83 C. C. A. 2nd Circuit.

In the case at bar the defendant took the total sales value of all products made by it during the time covered by the infringements and the sales value of the infringing articles as well as the total average value of the capital

and surplus of the entire business covered by the time of infringement and by the aid of these three factors and the rule of three, determined the alleged average value of plant and equipment employed in infringing operations and set the same at $24,758.05 and then estimated interest at 6% for the entire priod of the infringement so as to get the sum of $4,085.07.

The Master reduced this sum because not all sales of infringing articles were involved in the profits recovered, there being, as above stated, 727 tons of spirals as to which there were no profits while profits were allowed on 1,684 tons. The Master estimated that by going by the selling price, substantially 75% of the sales were profitable and so he allowed 75% of this $4,085.07 and reached the sum $3,063.80 as to which he allowed the defendant a rebate as set forth at page 216 of the record.

Now assuming these figures to be correct, the plaintiff alleges that the principle is all wrong.

The defendant's method of calculating interest assumes that all parts of the plants and equipments had had equal value. This is a mere presumption. There is nothing of any kind whatsoever in the case to justify this presumption. No effort has been made to segregate the part of defendant's plant employed in making infringing articles. Nothing is in the record to show the difference in cost between the cost of producing spirals and the cost of producing other products. The method of calculating employed is a hodge-podge lumped together rule of three method, leaving all the facts, except the grand totals of the business and the business of spirals, to inference and conjecture.

What the Supreme Court has said on this subject surely applies here:

> "In the present case the defendant's plant and real estate were used for several other and wholly different kinds of manufacture than the patented article, and the evidence offered to distinguish between the profits derived from the use of the plant and real estate for making the borated cotton and those attributable to the other sources of profits was not sufficient to enable the master to make a satisfactory apportionment or allowance for interest on the investment.
>
> We do not wish to be understood as holding that in no case where the plaintiff's damages are measured by the defendant's profits ought there to be an allowance in the latter's favor of interest on the money invested in the plant. Nor do we say that such an allowance may not be properly made even where the use of the plant is not wholly restricted to making the infringing article. But the evidence, in such a case, should enable the Master to satisfactorily apportion the interest between the several kinds of business." *Seabury & Johnson* v. *Am Ende*, 152 U. S. 561, 14 Sup. Ct. 683, 686.

We submit that in view of this authority and the well established practice of this Court, no interest should be allowed the defendant in view of the showing here made.

On the other hand, the plaintiff insists that interest should be allowed to him because each item is admitted by the defendant as to date and is liquidated as to amount so that it is possible to calculate exactly what interest is due from facts which are not in dispute.

Where damages are not liquided and have to be determined by the Court, it is conceded that the correct practice is not to allow interest. Such is not the case at bar. Damages are different from profits. Profits are entirely within the control of the defendant and entirely within its knowledge and when a defendant admits the amounts and dates of such profits, there is nothing more to be said provided the plaintiff agrees thereto, as is the case here. Interest should be allowed because there is in the record all the data necessary for its calculation.

Counsel for the plaintiff are unable to find any case in this Court exactly in point and therefore presents this point for judicial determination, with the contention that such interest should be allowed for the reasons given.

Conclusion.

In behalf of the plaintiff, it is submitted that the reissue in this case was proper and that all claims in suit are valid, both in view of the reissue and in view of the prior art, and it is also contended that damages in the sum of $3635 should be allowed in addition

to the profits which were admitted by the defendant were properly allowable and allowable without abatement and with interest, and it is requested that this case be remanded to the lower Court with instructions to disallow the interest allowed to the defendant in the sum of $3,063.80 and to allow interest to the plaintiff at 6% from the date of each sale, or some $22,700 plus interest.

GEO. E. VANDENBURGH,
Respondent.

By O. ELLERY EDWARDS,
his Solicitor.

CARLOS P. GRIFFIN,
JOSEPH W. COX,
Of Counsel.

In the Supreme Court of the United States

OCTOBER TERM, 1922.

CONCRETE STEEL COMPANY, PETITIONER,
v.
GEORGE E. VANDENBURGH. } No. 238.

ON WRIT OF CERTIORARI TO THE UNITED STATES DISTRICT COURT FOR THE SOUTHERN DISTRICT OF NEW YORK.

BRIEF FOR THE UNITED STATES AS AMICUS CURIÆ.

STATEMENT.

The United States is a party defendant in the Court of Claims in a suit brought under reissued patent No. 14182, entitled, "*George E. Vandenburgh* v. *United States*, No. 195–A." wherein the sum of $500,000 is claimed as compensation for the Government's use. The same claims of reissued patent No. 14182, viz, claims 1, 2, 3, 4, and 5 are in issue in that case as are here for consideration in *George E. Vandenburgh* v. *Truscon Steel Company*, No. 273, and the *Concrete Steel Company* v. *George E. Vandenburgh*, No. 238, on writs of certiorari directed to the Courts of Appeal of the Sixth and Second Circuits, respectively.

HISTORY OF REISSUED PATENT NO. 14182.

Original patent No. 841741 to Vandenburgh, issued January 22, 1907, and notwithstanding the great

activity and interest in the art of reinforced concrete building since that date this reissue was not applied for until July 1, 1916, nine years and five months after the inventor had received his original grant.

It seems incredible that the inventor when he first examined his original patent should not have at once recognized and immediately pushed his claim that the patent did not correctly set forth his invention. This is particularly forceful when a comparison of the reissue is made with the original patent. That the claims have been illegally broadened in their scope by reissue is an inescapable conclusion and no equitable theory or doctrine can possibly excuse the nine years delay. The many decisions of this court as to pertinent reissues, and most emphatically in *Miller* v. *Bridgeport Brass Company*, 104 U. S., page 350, hold that a two-year period of delay between the issuance of an original and an application for a reissued patent, creates a presumption of impropriety as to the grant that must be clearly explained. It is submitted that Vandenburgh has not satisfactorily rebutted the presumptive force of the nine years' delay, and that his reissue is of no force and effect.

THE REISSUE IS VOID FOR LACHES, AS DISTINCT FROM DELAY.

But the reissue is also void for laches in applying. The use of the word "rigid" in claims 1 and 2 to characterize the structure was obvious upon taking the patent out of its envelope. It required only the most ordinary intelligence to appreciate the fact

that "rigid" and "permanent" were not the same thing; and indeed, that a structure described as "permanent" was a wholly different thing from one described as "rigid." Anyone who pretends to a knowledge of engineering is familiar with these facts and knows the difference. The inventor is clearly chargeable with laches from the time that his original letters patent issued up to the time of his application for reissue, since the public, the third party in every patent litigation, was entitled to suppose that he had dedicated to its service the "permanent" fastening which he now seeks to monopolize, if that had been of his invention. But if this were not so he is certainly chargeable with notice from the time that this "rigidity" was directly called to his attention. On page 21 of the transcript in case 238, in his own deposition (taken in 1918) in the suit against the Electric Welding Company and introduced here by stipulation, he said:

> Q. When did you find out that that defect existed in your original patent?
>
> A. I found out several years ago; but I never have taken it up in a place where it should be taken up and go ahead with it.
>
> 30. Q. What do you mean by several years ago? Does that mean two or three?
>
> A. Well, I first made a study of it trying to get it on the market after the earthquake in San Francisco. I went to Washington, D. C., and got there on the 21st of July, 1906, right after the earthquake. The final patent papers were delivered to me on the 7th of January.

31. Q. Then at that time you discovered that the claims had in them the word "rigidly?"

A. Not at that time—well, no.

32. Q. When did you discover that?

A. In 1909 along about that time.

33. Q. You then discovered they had in them the word "rigidly?"

A. Yes, I got that from a concrete engineer in looking them over.

And from 1909 to 1916 he made no move to correct the alleged error. "The pretense in this case that there was an inadvertence and oversight which had escaped the notice of the patentee for fifteen (seven) years, is too bald for human credence. (*Miller* v. *Bridgeport Brass Company, supra.*)

But in spite of that, he asserts in his oath, transcript, page 122 (124), that—

> "With respect to claim 1 that he has claimed as his invention *more* than he had a right to claim as new; that *as soon* as said errors came to his knowledge and attention he applied for this reissue."

The inventor is an elderly man of no great education, and probably signed whatever was put before him without investigation, possibly with no adequate comprehension of its meaning. This does not, however, lessen the force of the improper statements contained in the oath, or make that true, which on its face, and on his own admission on the stand, was false when signed, was false when the Patent Office acted on it, and is false now. A reissue obtained by

falsehood, which can hardly be said to be legally unintentional, ought not to stand.

THE PRIOR ART.

Aside from the question of the validity of the reissue, an examination of the patents of the prior art conclusively shows that Vandenburgh's original patent was anticipated in every aspect. Vandenburgh's whole idea was a *rigid beam*, composed of a helix with turns slanting in opposite directions from its middle point and attached rigidly to a spacer, only a single spacer being used, except in the case of Figure 6, and in no case showing a coil attached to two spacers; that the device was not collapsible, but formed a truss; that the defendant's device is collapsible, does not form a truss, and was independently devised by the defendant, as is conceded, as "the natural and obvious" way of attaching the coil of wire to the two spacers so as to make the device collapsible; and that no part of this was due to any knowledge of the plaintiff's patent.

This brings us to a discussion of what is shown in the prior art; because, even assuming the validity of the plaintiff's patent, if the same result had been accomplished by others then we may take from the prior art the elements of his structure and combine them in any way we see fit; if we do not use his fundamental idea in making this combination, then obviously we do not infringe. And furthermore, if the assembling of the elements, even in the exact form shown by plaintiff, is "the natural and obvious" way of assem-

bling them, then equally naturally and obviously there is no invention present, and the plaintiff's patent can not be sustained.

In the brief of the petitioner, Concrete Steel Company, between pages 46 and 49, illustrations of the prior art patents and structures are to be found. These drawings and reproductions of patents clearly anticipate the alleged invention of Vandenburgh.

CONCLUSION.

It is submitted that in the many courts which have passed upon this reissue of Vandenburgh, all have been of the opinion that claims 1 and 2 are invalid, as being improperly reissued. In other claims the courts have found it unnecessary to consider that aspect, as noninfringement has been repeatedly held. This holding of course relieves the particular court of the necessity of holding them invalid for any of the reasons applied to claims 1 and 2. The United States in filing this memorandum respectfully calls the court's attention to the invalidity of the reissued patent *in toto* as distinct from the invalidity of any of its particular claims.

Respectfully,

JAMES M. BECK,
Solicitor General.

ROBERT H. LOVETT,
Assistant Attorney General.

MELVILLE D. CHURCH,
Attorney.

○

IN THE

SUPREME COURT OF THE UNITED STATES.

October Term, 1921.

CONCRETE STEEL COMPANY, Petitioner, v. GEORGE E. VANDENBURGH,	No. 674.

Stipulation.

The Court consenting thereto, it is Stipulated and Agreed that a certified copy of the final or second opinion of the Circuit Court of Appeals in this case, prepared by his Honor Judge Mayer, shall be filed in the office of the Clerk and printed copies thereof attached to the Transcript of Record in this case with the same force and effect as if the opinion had formed part of the original Transcript.

THOMAS J. JOHNSTON,
Counsel for Concrete Steel Company,
Petitioner.

O. ELLERY EDWARDS,
Counsel for George E. Vandenburgh.

Dated, New York, N. Y.,
September 25, 1922.

Opinion.

UNITED STATES CIRCUIT COURT OF APPEALS,

FOR THE SECOND CIRCUIT.

No. 120—October Term, 1921.

Argued November 17, 1921.
Decided December 14, 1921.

GEORGE E. VANDENBURGH,
Plaintiff-Appellant,

v.

CONCRETE STEEL COMPANY,
Defendant-Appellee.

Before: ROGERS, MANTON and MAYER,
Circuit Judges.

Appeals from the District Court of the United States for the Southern District of New York.

Carlos P. Griffin and *O. Ellery Edwards*, for Plaintiff.

Lucius E. Varney, Thomas J. Johnston and *Manvel Whittemore*, for Defendant.

Opinion.

Appeal from final decree of the District Court of the Southern District of New York in favor of plaintiff. Both parties appeal.

MAYER, *Circuit Judge*:

This is the ordinary patent infringement suit which now comes here on appeal from a final decree adjudging that plaintiff recover from defendant profits in the sum of $15,918.33 with interest from the date of the Master's report.

Originally, the District Court dismissed the bill for non-infringement but the decree was reversed for the reasons stated in 258 F. R. 143.

Thereafter, in due course, the usual interlocutory decree was entered, *inter alia*, referring the accounting to a Special Master. The Special Master reported that plaintiff was entitled to recover profits but not damages. The District Court sustained this report. Both the District Judge and the Master wrote opinions fully and carefully discussing the questions involved.

1. The patent has been considered by several courts, *Vandenburgh* v. *Electric Welding Company*, 259 F. R. 579, 263 F. R. 95; certiorari denied 253 U. S. 497; *Vandenburgh* v. *Truscon Steel Company* opinion of District Court for the Northern District of Ohio, Eastern Division dated September 23, 1920; and there have been differences of opinion.

The law of this case, however, is that set forth in this court's opinion per Judge Ward in 258 F. R. *supra*. The gist of the case may be recalled by the following quotation.

"These claims * * * (3 and 5 of the reissue) * * * should be construed consistently with the specifications, which are also literally the same in each patent, as meaning that the spiral coil is rigidly connected with the longitudinal bar at each point of contact. So construed the claim describes a continuous spiral rigidly and integrally connected with kerfs and spurs in the bar constituting a trusslike structure within the body of the concrete resisting lateral and longitudinal strains and which can be more cheaply manufactured than if the spiral were riveted or welded to the bar at each point of contact.

The defendant's witness Cummings frankly admits that this form of reinforcing structure was new in cement work and has come into general use. * * * The defendant's structure when set up to receive the concrete is exactly the same as plaintiff's except that the spiral coil is not rigidly fixed by kerfs and spurs on the bar. This enables the structure to be collapsed when not in use, a commercial improvement for purposes of shipment but which does not justify the defendant's appropriation of the plaintiff's structure."

Defendant's collapsible feature thus did not avoid infringement but merely added a commercial improvement for purposes of shipment.

It is contended by defendant that the case is one for apportionment of profits and that Court and Master erred when they ascribed (as did plaintiff) the whole value of defendant's struc-

ture as a commercial article to the Vandenburgh patent feature.

The theory of defendant is that all or, in any event, part of the commercial value of defendant's structure was due to its collapsible feature and, but for this, the structure would not have have been saleable. Therefore, defendant contends that when plaintiff has not adduced any testimony that the structure is salable when not collapsible or of the profits due to collapsibility, plaintiff has failed to carry the burden of proof cast upon him. *Westinghouse* v. *Wagner Mfg. Co.*, 225 U. S. 604.

Defendant did not introduce any testimony in respect of apportionment. It relied on its contention that because plaintiff failed to produce testimony upon which an apportionment could be based, he would be entitled to nominal damages only.

It may be assumed from the testimony of plaintiff's witnesses that if the structure were shipped there would be a saving in freight. It may, also, be assumed that in some instances, owing to competitive conditions, the determining factor in a sale might be this saving. Yet, it is entirely plain that there never would have been any sale whatever without this Vandenburgh feature. It was the Vandenburgh "form of reinforcing structure" infringed by defendant, which was new in the art. The advantage according to the expert Thayer, over the method, in the prior art, of riveting or wiring is that "the method of wiring uses up a good deal of the section of the bar. It was wasted that way and riveting is also expensive."

Thayer also mentioned the collapsible feature as a part of what he called the "Vandenburgh method" but, with this, we do not agree, in view of our former decision.

It is entirely clear, however, that defendant would never have sold a dollar's worth of its devices had it not availed of plaintiff's patent. The cheapness of manufacture was due to plaintiff's disclosure, which, therefore, created defendant's device as a commercial commodity. Because, then, in some instances, the additional feature of collapsibility saved freight, it cannot be said that this feature placed the burden of showing apportionment on plaintiff.

The test is whether the invention of the patent gives the whole value to the infringing device. Obviously, it must, in a case where the sale of the article would be impossible without availing of the disclosure of the patent and, where the additional feature had no relation to the structure, *qua* structure, or to its shipment as such but only to reduce expense in transportation, accomplished by means which in no manner changed the character of the structure when used for the purposes for which it was designed.

If, therefore, the saving of freight was an accounting element, the burden of so showing was on defendant.

Westinghouse v. *Wagner Mfg. Co.*, *supra.*

This is pecularily illustrated in this case.

Barbour, who is in charge of the details of the sales in defendant's New York office was called by plaintiff. He testified as follows:

> "Q41. In any event, these spirals are shipped collapsed, connected to some longitudinal bars, you understand that to be the subject matter of this suit? A. I understand that to be the subject matter of this suit, but the spirals are not all shipped in that way, not in my territory.
>
> Q42. What percentage are shipped in any other way? A. You mean the territory I know about, that is within New York City or a radius of 25 miles of New York City?
>
> Q43. Where you are selling? A. In New York City or a radius of 25 miles from New York, they ship what we call field assembled; that is, the coil wire is shipped, it is coiled to diameter and shipped separate as a coil, then the angles are punched and shipped separate, that is on account of a restriction.
>
> Q44. Assembled by you or assembled by the contractor? A. By the contractor on the job, what we call field assembly; that is an account of a restriction, I think it is, Metal Lathers Union; they won't allow us—they won't allow I don't know as I should say 'us', but they won't allow the contractors to use spiral in any other way in New York City or within a radius of 25 miles of New York."

The foregoing shows that a considerable business was done by defendant without the collap-

sible feature because of the "Union" restriction and, thus, destroys any contention that collapsibility was, in all instances, an indispensible requisite.

From what has been said *supra,* there was no obligation upon plaintiff to apportion the profits between the Vandenburgh features and the prior art. There was no standard of comparison and, on the evidence in this case, there was no occasion for that reason to apportion profits. See *Philadelphia Rubber Works Co.* v. *U. S. Rubber Reclaiming Works,* F. R. , recently decided by this court.

2. On the facts in the case as clearly set forth by the master and approved by Judge Knox, there was no evidence which afforded any basis for fixing the amount of a reasonable royalty. We think this question was wholly one of fact to be disposed of on settled principles which do not call for exposition.

3. Plaintiff urges that he is entitled to recover interest at six per cent. as to each item of profit from the date thereof as set forth in defendant's account. There is no evidence of wanton infringement. The mere fact that the courts held different views as to the claims of the patent is sufficient to negative any such suggestion.

In an infringment case, where there is a genuine controversy, it is settled in this circuit, that interest runs from the filing date of the Master's report.

Oehring against *Fox Typewriting Co.*, 251 F. R., 584;
Metallic Rubber Tire Co. v. *Hartford Rubber Works Company, supra.*
The Philadelphia Rubber Works Co. v. *U. S. Rubber Reclaiming Works, et al., supra.*

4. Plaintiff, contrary to defendant's contention was not guilty of laches and there were no intervening rights. Plaintiff has recovered profits only from August 15, 1916, the date of the reissue patent.

The decree is affirmed without costs on this appeal.

In view of the result, there is no occasion to deal further with the Master's motion to dismiss or affirm as to his allowance.

A true copy.

(Seal)

WM. PARKIN,
Clerk.

IN THE

Supreme Court of the United States.

GEORGE E. VANDENBURGH,
Plaintiff,

vs.

CONCRETE STEEL COMPANY,
Defendant-Petitioner.

PETITION FOR WRIT OF CERTIORARI TO THE CIRCUIT COURT OF APPEALS FOR THE SECOND CIRCUIT.

To the Honorable the Chief Justice of the United States and the Eight Associate Justices Thereof, Constituting the Supreme Court of the United States:

Your petitioner, Concrete Steel Company, respectfully represents:

I. That it is a corporation organized under the laws of the State of Delaware; that on or about the 7th day of February, 1917, George E. Vandenburgh, plaintiff herein, filed his Bill of Complaint in the District Court of the United States for the Southern District of New York, alleging infringement of his reissued Letters Patent, No. 14,182, dated August 15, 1916; and thereafter your petitioner filed its answer thereto, and such proceedings were had that the cause came on for trial before the Hon. Charles M. Hough, a Circuit Judge duly assigned to hold said District Court, and upon due consideration the said District Court ordered that the Bill be dismissed.

II. Thereafter an appeal was taken to the Circuit Court of Appeals for the Second District before their Honors Judges Ward, Rogers and Manton, holding the court, and such proceedings were had that the court ordered the decree of dismissal to be reversed and the cause to be referred to a Master to take account of profits and damages.

III. Such proceedings were had before the Master that on the 24th day of November, 1920, he reported to the court that there was due from my defendant to the plaintiff the sum of $15,918.33; and thereafter exceptions were duly taken and the matter came before the District Court for the Southern District of New York, by which the Master's order was confirmed.

Thereupon an appeal was taken to the Honorable the Circuit Court of Appeals, for the Second Circuit, and such proceedings were had that on or about the 14th day of December, 1921, the Circuit Court of Appeals affirmed the decree of the District Court in all things.

IV. Your petitioner further represents that there have been further proceedings based upon the reissued Letters Patent set out in the Bill of Complaint in this case, but that no other of said proceedings has resulted in a money judgment against any of the defendants save only your petitioner and that such other proceedings have been as follows:

A. A suit in the Western District of Pennsylvania in which on or about the 24th day of July, 1918, his Honor Judge Charles P. Orr ordered the Bill of Complaint to be dismissed. An appeal was thereupon taken to the Circuit Court of Appeals for the Third Circuit wherein the order of the District Court was affirmed. The decree of the District Court held the Letters-Patent to be invalid and of no effect in law, and also held that the defendant did not infringe. The Circuit Court of Appeals for the Third Circuit held (on February 19,

1920) that the defendant did not infringe and did not examine the question of validity.

B. A suit was filed in the Northern District of Ohio, Eastern Division, against the Truscon Steel Company, and such proceedings were had that on or about the 23rd day of September, 1920, his Honor Judge Westenhaver, sitting in the said District Court, ordered the Bill of Complaint to be dismissed. Thereupon an appeal was taken to the Circuit Court of Appeals for the Sixth Circuit, which appeal has been argued and submitted, but has not yet been determined. The decree of the District Court held that the Letters-Patent in suit were invalid, after a full examination of the record; and no holding has been made by the Circuit Court of Appeals for the Sixth Circuit.

C. On or about the 15th day of June, 1921, a suit was filed against the United States in the Court of Claims for infringement of the Letters-Patent in suit in this case, alleging that there was due and recoverable by the plaintiff from the United States the sum of $500,000. The said suit is at issue and testimony therein is due to proceed, but it has not yet been submitted to the court for determination.

V. Your petitioner is advised and believes that the determination of the Honorable the Circuit Court of Appeals in this case is final, and is erroneous, in the following particulars:

(1) In holding the said Letters-Patent in suit to be valid;

(2) In holding the said Letters-Patent in suit to be infringed;

(3) In not considering the references cited by the defendant, which have been found adequate in all other courts save this to annul the patent;

(4) In basing its conclusion of validity upon the isolated statements of a single witness testifying con-

cerning a construction of his own, which the Circuit Court of Appeals in the Third Circuit has held did not infringe the Letters-Patent in suit; and in applying the statements of the witness to the said Letters-Patent and not restricting it to the non-infringing construction to which he testified;

(5) In not holding the said reissued Letters-Patent to be void and of no effect in law because fraudulently reissued ten years after the issue of the original Letters-Patent, for the purpose of broadening the scope thereof and to cover constructions not covered by the said original Letters-Patent;

(6) In not affirming a decree of the District Court holding said reissued Letters-Patent to be restricted to a rigid construction only; and, therefore, not to be infringed by the defendant, whose construction is admittedly collapsible;

(7) In not ordering the Bill of Complaint to be dismissed with costs in all courts.

VI. Your petitioner further represents that the plaintiff in this case is a man of no means or substance and is in fact financially wholly irresponsible; and that if the judgment in this case be collected an order of restitution will be nugatory; inasmuch as your petitioner is informed, and verily believes, that a substantial part of the judgment is due and payable to counsel for services, which payments the plaintiff will be unable to make unless the judgment be collected; and that so much thereof will be expended in the payment of these fees and expenses that if an order of restitution shall be made after a determination of the application for the writ hereinafter referred to, the plaintiff will be unable, by reason of lack of means, to comply therewith, even if service could be obtained on him in such way as to be effective, he being, as your petitioner is advised and believes, a non-resident of the Second Circuit, residing in Washington, in the District of Columbia.

VII. Herewith your petitioner files—

Certified copies and additional copies sufficient for the use of the court of the Transcript of Record upon the first appeal, and also of the Transcript of Record upon the second appeal;

Printed copies of the opinion of the Circuit Court of Appeals for the Second Circuit on the first appeal, and also on the second and final appeal;

Printed copies of the Opinion of his Honor Judge Orr in the Western District of Pennsylvania in the suit of this plaintiff against the Electric Welding Company;

Printed copies of the Opinion of the Circuit Court of Appeals for the Third Circuit upon affirming the decree of the District Court for the Western District of Pennsylvania in the said suit;

Printed copies of the decision of his Honor Judge Westenhaver in the District Court for the Northern District of Ohio, Eastern Division;

Printed copies of the petition filed by this plaintiff against the United States in the Court of Claims.

VIII. Wherefore your petitioner prays that your Honors will issue to the said Circuit Court of Appeals for the Second Circuit of your writ of certiorari, commanding it to send to this court the record of proceedings in the cause that the same may be examined here, and that right and justice may be done.

And your petitioner prays that your Honors will stay the proceedings in the District Court in the Second District of New York until such time as your Honors may have acted upon this application, and upon the return to the said writ of certiorari, if the same shall be issued.

And your petitioner will ever pray.

CONCRETE STEEL COMPANY,
Petitioner.

By

THOMAS J. JOHNSTON,
Of Counsel.

IN THE
SUPREME COURT OF THE UNITED STATES.

CONCRETE STEEL COMPANY,
Petitioner,
v.
GEORGE E. VANDENBURGH,
Respondent.

October Term
1921.

MEMORANDUM UPON THE APPLICATION FOR A STAY AND FOR THE WRIT OF CERTIORARI TO THE SECOND CIRCUIT COURT OF APPEALS.

So far as the application for a stay is concerned, we are authorized by Mr. Edwards, solicitor for the plaintiff, to say to the Court that the preservation of the *status quo* until the Court shall act upon the application for *certiorari* is not opposed by the plaintiff.

This is a patent suit coming up in the ordinary way, briefly as follows: There was a bill and answer. The District Court held that there was no infringement (Judge Hough presiding) and that he need not consider intervening rights or the validity of the reissued letters-patent, which had been reissued ten years after the original and seven years after the plaintiff discovered the supposed errors in it, and for the purpose of broadening the claims. He held also that he need not consider validity since the letters-patent from their nature and position in the art were restricted to a *rigid* construction, whereas the defendant's structure was a *collapsible* construction. He held also that plaintiff's patent did

not disclose or describe the invention which he is now attempting to claim.

On appeal, the Second Circuit Court of Appeals reversed Judge Hough's decision, held the patent to be valid and infringed, and directed a reference to a Master.

Another suit was then pending in the Western District of Pennsylvania and intermediate of Judge Hough's decision and that of our Circuit Court of Appeals, Judge Orr held in that suit that the letters-patent in suit were invalid in view of the prior art and also that the structure of the Electric Welding Company, defendant in that case, did not infringe. Appeal was taken to the Third Circuit Court of Appeals, which held that Judge Orr's opinion was correct as to infringement, and practically, that it need not decide the question of validity since the dismissal must be affirmed in any event. It did not consider the references or the prior art, or rule at all upon the question of validity or scope, except in a minor matter concerning the particular shape of the teeth of the concrete reinforcing structure described.

Under a decision of the District Court for the Southern District of New York, speaking by Judge Hough in *Victor T. M. Co.* v. *Sonora Phono. Co.*, 188 Fed. Rep., 330, the failure to reverse the decision of Judge Orr on the question of invalidity leaves that the law of the Third Circuit, *i. e.*, that the patent is invalid; so that the competitors of the defendant in this case are free to use the patented structure exactly, as well as in the modified forms which have been held not to be infringements.

Another suit was filed in the Northern District of Ohio in which Judge Westenhaver, while holding that he could dispose of the case on the question of infringement, declined to do so, and considered very fully the prior art, the decision of the Circuit Court of Appeals for the Second Circuit, and Judge Hough's opinion. After mature consideration, he followed Judge Hough's opinion and explained that the Second Circuit Court of Appeals had not investigated the question of validity; and that on the references before it, its decision should

have been that the patent was invalid. That case has gone to the Circuit Court of Appeals for the Sixth Circuit and has been heard there, but the opinion has not yet been rendered.

Another suit on the letters-patent involved here has been filed in the Court of Claims against the United States in which the *ad damnum* is set at $500,000. No substantial progress has been made in that suit. If the *certiorari* be granted in this case, it will settle the important issue of validity for that, as well as the conflict of decision in the lower courts of the United States. As the question will come here eventually, either upon this proceeding or by direct appeal from the Court of Claims, this Court must deal with it at some time, and it has seemed to us the short and simple way to settle the issue of validity now. If the patent is invalid, as held by Judge Westenhaver and Judge Orr, then the United States should not be put to the expense of defending the suit in the Court of Claims.

After all of these proceedings had been instituted and some of them decided, the Master in this case filed his report, awarding $15,918.33 profits. The report was confirmed by the District Court; the defendant has given a bond fully covering its liability; and the decision below has been now confirmed by the Circuit Court of Appeals in a decision by Judge Mayer. Judge Mayer was not upon the bench on the former appeal, and of course accepted the doctrine of the opinion formerly filed in the case.

Copies of all of these opinions referred to, and a copy of the complaint in the Court of Claims, have been printed and are appended to this brief. Copies of the Transcripts of Record upon both appeals to the Circuit Court of Appeals of the Second Circuit in this case are also filed.

So far as a disposition of the cases is concerned on this application instead of an application made at an earlier date immediately after the filing of the original opinion of the Circuit Court of Appeals holding the

patent valid and infringed) that seems to be disposed of by *Hamilton Brown Shoe Company* v. *Wolf Bros. & Co.*, 240 U. S., 251, in which this Court held that a sufficient reason for not taking up the matter on *certiorari* at the earlier time was that the decree was not final. We understand this to mean that the Court will discuss all the questions brought up by the record, if it shall elect to issue its writ.

Subject Matter of the Suit.

This is a concrete reinforcing structure built of iron to be embedded in the concrete. All the Courts have held that the art is an old one and a full one. The natural corollary of this is that any patent issued in the art and purporting to cover details must necessarily be of restricted scope. We believe that this requires no citation of authority.

Reissue Defense.

The original patent is No. 841,741, issued on January 22, 1907. The reissue is No. 14,182, and was issued August 15, 1916, practically *ten years* after the patent had been issued in the first instance. All of the reissue decisions of this Court at least since Miller *v.* The Brass Co., 104 U. S., 352, have held that long delays in reissues were not to be countenanced; and that two years was a reasonable limit, beyond which full explanation must be made of delay.

No explanation whatever was given by the plaintiff for his delay. The oath which he filed with his application for reissue is found on page 122 of the Transcript of Record on the first appeal. It abounds with conclusions of law and is singularly deficient in statements of fact, other than those which appear from the face of the record itself; and not a word is said in the whole oath of *any* reason why the alleged errors were not immediately obvious "upon taking the patent from its envelope," as

was once said by this Court. It abounds also in misstatements of fact in that it says that the new claims which it has substituted and for which the reissue was granted are more limited than the original claims;whereas every Court which has dealt with these new claims has held them to be invalid, because not only broader than the original, but broader than the plaintiff's invention; and as an attempt to cover something which he did not show or describe. The oath also stated, (see page 124) "that as soon as said errors came to his knowledge and attention, he applied for this reissue;" whereas when he went upon the stand in the Electric Welding suit heretofore referred to, he testified, see page 21 of the Transcript of Record on the first appeal in this case, at Q. 32, that he discovered the errors "in 1909, along about that time;" whereas the reissue application was filed in 1916.

In a man of a higher grade of intelligence, and less dependent for light and leading upon the voice of counsel, the conflict of statement might be given a very harsh construction; and in any event, it is sufficient to justify holding the reissue invalid *in toto*.

Defendant's Intervening Rights.

The last decision of this court of Appeals (Judge Mayer's) holds that defendant had no intervening rights; but Judge Hough said that he "did not consider intervening rights," and the original decision by Judge Ward of the Circuit Court of Appeals does not consider them either; see page 138, Transcript on first appeal.

That defendant has these intervening rights is clear from the Exhibit D (beginning at page 126 first Transcript) disclosing the correspondence between Mr. Havemeyer, the defendant's president, and Mr. Griffin, the plaintiff's solicitor, concerning the patent. This was initiated before the application for reissue was filed, and the claim of infringement and a threat of suit were made.

Defendant replied that it did not infringe, and no suit was brought upon the original letters-patent. The very ground of the defense of non-infringement was that defendant's structure *was collapsible*, whereas the letters-patent in suit distinctly claimed to be and was in fact "rigid"; and also that the plaintiff's structure formed "a truss within the concrete." As defendant's structure could in no sense be called a truss or rigid, the ground of non-infringement was clearly reasonable.

Thereafter the application for reissue was filed, as held by Judge Hough, "to catch manufacturers like defendant," who were using collapsible structures and selling them. Incidentally it may be said that the plaintiff in the case has never made, used or sold a pound of the reinforcing described in his patent; nor so far as the record discloses has anyone else; Judge Hough held (p. 135) "there is no proof at all that plaintiff has contributed to this growth" in the concrete art. The Master holds, page 216 Transcript on second appeal, "Vandenburgh never made or sold any concrete reinforcement and never exploited the patent in any way." These holdings are all that have been made; but in none of the suits has any testimony been introduced showing any use of the actual structure patented by the plaintiff. It appears to be conceded that he made none.

We therefore have this situation presented to the Court: There is an apparent radical difference of opinion among the judges as to the validity of the patent in suit; but no court which has examined and discussed the prior art disclosed by the references in this record has held it to be valid. The prior art is admitted to show all of the elements shown in the defendant's patent; see for example the Considere patent, page 65 Transcript on first appeal, showing the vertical bars and the so-called spiral or helix; the Eason patent, page 63 former Transcript, showing the vertical bar, independent rings and the kerf and spur attachment; the Clark patent, page 60 old Transcript, showing the kerf and spur in a somewhat different form, with wires held in place to a vertical bar

thereby; the Norwood patent, page 57 old Transcript, showing the identical form of kerf and spur for securing wires to longitudinal bars used in a screen employed in concrete work; the Prescott and Bennett patent, page 55 old Transcript, which shows the helix, the bars (here laid horizontal) and the kerf and spur attachment. This also is a screen used in concrete work every day.

The real origin of the reissue, in addition to defendant's collapsible structure, is undoubtedly to be found in the McClure patent, coming out a few months after plaintiff's; see page 94, old Transcript.

Now the result of the whole matter is that these persons in other jurisdictions, active competitors of the defendant in this, are free to use the patented structure if they shall see fit, whereas the defendant cannot do so, being under injunction. Furthermore, these other users in other jurisdictions are free from contribution, whereas the defendant has given a bond for $17,435.00 to secure the judgment in this case. If the decision of the Circuit Court of Appeals in this case be upheld, the claim against the United States for $500,000. is not unreasonable and may possibly be allowed; and yet this will be for a piece of paper, since it cannot be pretended that the defendant's idea was an invention at all, or ever went into use.

The original opinion of the Circuit Court of Appeals in this suit does not discuss the prior art and seems to have overlooked it entirely. The Vandenburgh patent does not cover a spiral; nor did Vandenburgh invent that, as is shown clearly in the prior art.

The Question of Damages.

It is unnecessary to consider the question of damages because the Master has held (and all of the Courts have sustained him) that the plaintiff had suffered no damages, because he had never made or sold the structure and had therefore lost no sales; and because there was no testimony in the case from which a reasonable royalty could be deduced. No other conclusion could be reached

on the record in this case. The testimony was in hopeless conflict and on the part of the plaintiff of the wildest and most extravagant character, ranging from eight to thirteen dollars a ton royalty on a structure on which the engineering assistant of the United States Steel Corporation said that five dollars a ton was a very satisfactory *total* profit; which of course included the sale of the iron work *per se*. There was other testimony, but as the three tribunals below, the Master, the District Court and the Circuit Court of Appeals, have reached the same conclusion about it, it seems unnecessary to refer to it before this Court, certainly on this preliminary examination of the case.

Profits.

As to defendant's profits, all of the Courts which have dealt with them have fallen into the same very grave and very serious errors in that, while apparently recognizing its controlling force, they have failed utterly to apply the doctrine of the case Westinghouse *v.* Wagner, 225 U. S., 604. The Master's holdings on that subject are in flat conflict with one another; as he says in one place that the case is one falling under class (d) of Westinghouse *v.* Wagner, and "it was the duty of the plaintiff to apportion the profits between those due to the patented feature and those attributable to the unpatented part, or to show that such apportionment was impossible by reason of the defendant's acts," further holding that "the plaintiff has made no effort to work out an apportionment or to show that one was difficult or impossible"; see page 210, Transcript on second appeal; and on page 212 "the plaintiff has wholly failed to sustain the burden of making such apportionment"; but in another place, he makes the same mistake as the Circuit Court of Appeals in applying the testimony of Mr. Cummings in the Electric Welding case to the plaintiff's claimed structure, whereas Mr. Cummings dealt only with one element, and that old in the art; that is the difference between hoops

and a spiral, which Vandenburgh did not invent and which his claim does not cover; for the Master further goes on to hold that the case comes within class (b) of Westinghouse *v.* Wagner, where "the patented feature gives the whole value to the structure"; see page 215, middle.

He thus fails (and the Courts have followed him in failing) to distinguish

(a) Between the profits from the sale of ironwork, as distinct from the profits due to the plaintiff's invention; and

(b) Between the profits due to the plaintiff's invention and those due to the collapsibility of the structure, which the Circuit Court of Appeals in its first opinion decided was an improvement upon the plaintiff's structure, introduced *by the defendant.*

The result of these findings is to set at naught the whole line of distinctions found in Westinghouse *v.* Wagner, and to make the defendant liable for its profits on the sales of ironwork, and for those due to its collapsible improvement, so-called, in addition to those due to the plaintiff's patent; of which not a single sale was ever made either by the plaintiff, or by the defendant, or by anyone else, so far as this record discloses. The situation is not the same as the one presented to this Court in Westinghouse *v.* Wagner, because at that time the careful distinctions made in that case and the course of practice outlined in general by this Court in accounting cases had not been made, and the plaintiff in that case was not in a position to apply the instructions of this Court. In the instant case, they had been in the books for about six years and there was no reason why the defendant should be called on to give any evidence on these questions until the plaintiff had shown according to the doctrine of Westinghouse *v.* Wagner either (A) that such an apportionment was impossible; or (B)

that it had been prevented from making it by the act of the defendant.

Both of these contentions are disposed of by the Master, the first one as already indicated; and as to the second one (regarding the conduct of the defendant) the Master says, page 221, second Transcript "the defendant has shown in the proceedings before me no disposition to cause unreasonable delay or in any way harass or impede the plaintiff;" while a casual examination of the record will show that every call for information from the defendant's books has been fully and fairly met, and there is not even an exception or objection raised by the plaintiff as to anything which the defendant has done. It is simply a plain case of a failure to prove the plaintiff's case, and a refusal by the Master and the courts below to be guided by the opinion of this Court.

CONCRETE STEEL COMPANY,

by

THOMAS J. JOHNSTON,
Its Counsel.

L. E. VARNEY,
T. J. JOHNSTON,
E. G. CURTIS,
EMERY, VARNEY, BLAIR & HOGUET,
Of Counsel.

New York, December 31, 1921.

APPENDIX A.

Opinion.

UNITED STATES CIRCUIT COURT OF APPEALS.

FOR THE SECOND CIRCUIT.

No. 172—October Term, 1918.

Argued March 3, 1919. Decided April 16, 1919.

GEORGE E. VANDENBURGH,
Plaintiff-Appellant,

vs.

CONCRETE STEEL COMPANY,
Defendant-Appellee.

Appeal from the District Court of the United States for the Southern District of New York.

Before WARD, ROGERS *and* MANTON, *Circuit Judges.*

JAMES H. GRIFFIN, *for Plaintiff-Appellant.*

LUCIUS E. VARNEY, *for Defendant-Appellee.*

WARD, *Circuit Judge.*

U. S. Reissued Patent 14182 to George E. Vandenburgh for a concrete reinforcing bar was held void for want of invention by the District Court for the Western District of Pennsylvania in the suit of *Vandenburgh* v. *Electric Welding Co.*, while the court below dismissed the bill in this case against the Concrete Steel Company for non-infringement. Both courts held that the original patent did not contemplate collapsibility of the structure because the spiral coil was described as rigidly fixed by kerfs and spurs on the reinforcing bar. For this reason it was held that claims 1 and 2 of the reissue which were

intended to cover collapsibility of the structure were invalid as too broad. We agree in this conclusion.

But claim 3 of the reissue is literally the same as claim 3 of the original patent and claim 5 of the reissue is literally the same as claim 4 of the original patent. These claims should be construed consistently with the specifications, which are also literally the same in each patent, as meaning that the spiral coil is rigidly connected with the longitudinal bar at each point of contact. So construed the claim describes a continuous spiral rigidly and integrally connected with kerfs and spurs in the bar constituting a trusslike structure within the body of the concrete resisting lateral and longitudinal strains and which can be more cheaply manufactured than if the spiral were riveted or welded to the bar at each point of contact.

The defendant's witness Cummings frankly admits that this form of reinforcing structure was new in cement work and has come into general use. The fact that claims 1 and 2 of the reissue are invalid as too broad does not invalidate claims 3 and 5, *Gage* v. *Herring*, 106 U. S., 640, 646. The defendant's structure when set up to receive the concrete is exactly the same as plaintiff's except that the spiral coil is not rigidly fixed by kerfs and spurs on the bar. This enables the structure to be collapsed when not in use, a commercial improvement for purposes of shipment but which does not justify the defendant's appropriation of the plaintiff's structure.

The decree is reversed with half costs to the plaintiff.

APPENDIX B.

UNITED STATES CIRCUIT COURT OF APPEALS,

FOR THE SECOND CIRCUIT.

GEORGE E. VANDENBURGH,
Plaintiff-Appellant,

against

CONCRETE STEEL COMPANY,
Defendant-Appellant.

Before ROGERS, MANTON and MAYER, *Circuit Judges.*

CARLOS P. GRIFFIN and O. ELLERY EDWARDS for plaintiff.

LUCIUS E. VARNEY, THOMAS J. JOHNSTON and MANVEL WHITTEMORE for defendant.

Appeal from final decree of the District Court of the Southern District of New York in favor of plaintiff. Both parties appeal.

MAYER, *Circuit Judge*:

This is the ordinary patent infringement suit which now comes here on appeal from a final decree adjudging that plaintiff recover from defendant profits in the sum of $15,918.33 with interest from the date of the Master's report.

Originally, the District Court dismissed the bill for non-infringement but the decree was reversed for the reasons stated in 258 F. R. 143.

Thereafter, in due course, the usual interlocutory decree was entered, *inter alia,* referring the accounting to a Special Master. The Special Master reported that plaintiff was entitled to recover profits but not dam-

ages. The District Court sustained this report. Both the District Judge and the Master wrote opinions fully and carefully discussing the questions involved.

1. The patent has been considered by several courts, *Vandenburgh* v. *Electric Welding Company*, 259 F. R. 579, 263 F. R. 95, *certiorari* denied 253 U. S. 497, *Vandenburgh* v. *Truscon Steel Company*, opinion of District Court for the Northern District of Ohio, Eastern Division dated September 23, 1920; and there have been differences of opinion.

The law of this case, however, is that set forth in this Court's opinion per Judge Ward in 258 F. R. *supra*. The gist of the case may be recalled by the following quotation:

> "These claims * * * (3 and 5 of the reissue) * * * should be construed consistently with the specifications, which are also literally the same in each patent, as meaning that the spiral coil is rigidly connected with the longitudinal bar at each point of contact. So construed the claim describes a continuous spiral rigidly and integrally connected with kerfs and spurs in the bar constituting a trusslike structure within the body of the concrete resisting lateral and longitudinal strains and which can be more cheaply manufactured than if the spiral were riveted or welded to the bar at each point of contact.
>
> The defendant's witness Cummings frankly admits that this form of reinforcing a structure was new in cement work and has come into general use. * * * The defendant's structure when set up to receive the concrete is exactly the same as plaintiff's except that the spiral coil is not rigidly fixed by kerfs and spurs on the bar. This enables the structure to be collapsed when not in use, a commercial improvement for purposes of shipment but which does not justify the defendant's appropriation of the plaintiff's structure."

Defendant's collapsible feature thus did not avoid infringement but merely added a commercial improvement for purposes of shipment.

It is contended by defendant that the case is one for apportionment of profits and that Court and Master erred when they ascribed (as did plaintiff) the whole value of defendant's structure as a commercial article to the Vandenburgh patent feature.

The theory of defendant is that all or, in any event, part of the commercial value of defendant's structure was due to its collapsible feature and, but for this, the structure would not have been salable. Therefore, defendant contends that when plaintiff has not adduced any testimony that the structure is salable when not collapsible or of the profits due to collapsibility, plaintiff has failed to carry the burden of proof cast upon him. *Westinghouse* v. *Wagner Mfg. Co.*, 225 U. S. 604.

Defendant did not introduce any testimony in respect of apportionment. It relied on its contention that because plaintiff failed to produce testimony upon which an apportionment could be based, he would be entitled to nominal damages only.

It may be assumed from the testimony of plaintiff's witnesses that if the structure were shipped there would be a saving in freight. It may, also, be assumed that in some instances, owing to competitive conditions, the determining factor in a sale might be this saving. Yet, it is entirely plain that there never would have been any sale whatever without this Vandenburgh feature. It was the Vandenburgh "form of reinforcing structure" infringed by defendant, which was new in the art. The advantage according to the expert Thayer, over the method, in the prior art of riveting or wiring is that "the method of wiring used up a good deal of the section of the bar. It was that way and riveting is also expensive."

Thayer also mentioned the collapsible feature as a part of what he called the "Vandenburgh method," but, with this, we do not agree, in view of our former decision.

It is entirely clear, however, that defendant would never have sold a dollar's worth of its devices had it not availed of plaintiff's patent. The cheapness of manufacture was due to plaintiff's disclosure, which, therefore, created defendant's device as a commercial commodity. Because, then, in some instances, the additional feature of collapsibility saved freight, it cannot be said that this feature placed the burden of showing apportionment on plaintiff.

The test is whether the invention of the patent gives the whole value to the infringing device. Obviously, it must, in a case where the sale of the article would be impossible without availing of the disclosure of the patent and, where the additional feature had no relation to the structure, *cua* structure, or to its shipment as such but only to reduced expense in transportation, accomplished by means which in no manner changed the character of the structure when used for the purposes for which it was designed.

If, therefore, the saving of freight was an accounting element, the burden of so showing was on defendant.

Westinghouse v. *Wagner Mfg. Co., supra.*

This is peculiarly illustrated in this case.

Barbour, who is in charge of the details of the sales in defendant's New York office, was called by plaintiff. He testified as follows:

> "Q. 41. In any event, these spirals are shipped collapsed, connected to some longitudinal bars, you understand that to be the subject matter of this suit? A. I understand that to be the subject matter of this suit, but the spirals are not all shipped in that way, not in my territory.
>
> Q. 42. What percentage are shipped in any other way? A. You mean the territory I know about, that is within New York City or a radius of 25 miles of New York City?

Q. 43. Where you are selling? A. In New York City or a radius of 25 miles from New York, they ship what we call field assembled; that is, the coil wire is shipped, it is coiled to diameter and shipped separate as a coil, then the angles are punched and shipped separate, that is on account of a restriction.

Q. 44. Assembled by you or assembled by the contractor? A. By the contractor on the job, what we call field assembly; that is on account of a restriction, I think it is, Metal Lathers Union; they won't allow us—they won't allow I don't know as I should say 'us,' but they won't allow the contractors to use spiral in any other way in New York City or within a radius of 25 miles of New York."

The foregoing shows that a considerable business was done by defendant without the collapsible feature because of the "Union" restriction and, thus, destroys any contention that collapsibility was, in all instances, an indispensable requisite.

From what has been said, *supra*, there was no obligation upon plaintiff to apportion the profits between the Vandenburgh features and the prior art. There was no standard of comparison and, on the evidence in this case, there was no occasion for that reason to apportion profits. See *Philadelphia Rubber Works Co.* v. *U. S. Rubber Reclaiming Works,* F. R. , recently decided by this court.

2. On the facts in the case as clearly set forth by the Master and approved by Judge Knox, there was no evidence which afforded any basis for fixing the amount of a reasonable royalty. We think this question was wholly one of fact to be disposed of on settled principles which do not call for exposition.

3. Plaintiff urges that he is entitled to recover interest as six per cent as to each item of profit from the date thereof as set forth in defendant's account. There

is no evidence of wanton infringement. The mere fact that the courts held different views as to the claims of the patent is sufficient to negative any such suggestion.

Metallic Rubber Tire Company v. *Hartford Rubber Works Company,* F. R. .
The Philadelphia Rubber Works Co. v. *U. S. Rubber Reclaiming Works, et al.*

In an infringement case, where there is a genuine controversy, it is settled in this circuit, that interest runs from the filing date of the Master's report.

Oehring against *Fox Typewriter Co.,* 251 F. R. 584.
Metallic Rubber Tire Co. v. *Hartford Rubber Works Company, supra.*
The Philadelphia Rubber Works Co. v. *U. S. Rubber Reclaiming Works, et al., supra.*

4. Plaintiff, contrary to defendant's contention, was not guilty of laches and there were no intervening rights. Plaintiff has recovered profits only from August 15, 1916, the date of the reissue patent.

The decree is affirmed without costs on this appeal.

In view of the result, there is no occasion to deal further with the Master's motion to dismiss or affirm as to his allowance.

APPENDIX C.

Opinion of Judge Orr.

IN THE

DISTRICT COURT OF THE UNITED STATES.

FOR THE WESTERN DISTRICT OF PENNSYLVANIA.

GEORGE E. VANDENBURGH, vs. ELECTRIC WELDING COMPANY.	No. 127 May Term, 1917. In Equity.

ORR, *J.*

The plaintiff who is the patentee and owner of re-issued patent No. 14,182, dated August 15, 1916, for a "reinforcing-bar," filed his bill, against the defendant charging that the defendant has infringed plaintiff's rights under said re-issued patent and demanding an accounting. The bill is in the ordinary form. The answer set up that the patent is invalid and further that if the patent could by any means be adjudged valid, yet defendant has not and does not use the device of the patent and therefore does not infringe any of plaintiff's rights granted to him by the said patent. By stipulation filed claims one, two and three of the re-issued patent are involved.

The original patent is No. 841,741 and was issued January 22, 1907, upon an application filed May 9, 1906. The drawings attached to the re-issued patent are the same as those attached to the original patent, except that they are upon a smaller scale. The specification of the reissued patent is for all purposes necessary for the con-

sideration of this case, the same as the specification of the original patent. The only difference between the two patents is in the matter of the claims which for the present need not be considered.

The patent relates to the art of reinforcing concrete. It is one of an exceedingly large number in that art, many of which have been submitted to this court in other cases in which the art has received consideration. In none of these cases has there been the same evidence of prior uses or the same evidence as to the state of the art at and immediately before the time when the various patents under consideration were applied for. In the present case the evidence of the state of the art at and before the time of the application by the plaintiff for his original patent is more voluminous than in any case that has been brought hitherto before this court. The evidence in this case shows that the study of methods of reinforcing concrete has been intense and widespread for years. The object of reinforcement is to give strength in those parts of the concrete structure where strains may be expected. Building operations close to the public streets and bridges and road construction on highways and along railroads have made the general public familiar with the facts that long rods and bars, short rods and bars, rods and bars with angles or with curves or loops, wire meshwork and meshwork of other materials are all sometimes severally used for that purpose. The calculation of stresses by constructing engineers and the introduction into the concrete mass of reinforcing members where such stress is likely to be found are matters in which the public is so largely interested that serious consideration should be given to the question of the validity of the patent, although as between the parties to the litigation the case may be disposed of because infringement is not found.

It is not necessary to give a pictorial illustration of the plaintiff's structure. It suggests the pen holder rack which for many years has been found on writing desks and which consists of a horizontal spiral coil of wire

fastened to a base by means of which these separate coils are maintained in a general vertical position.

We refer now to the specification and find that the patentee sets forth the nature and object of what he calls his invention in the following language:

> "This invention relates to a reinforcing-bar particularly adapted for cement and concrete construction wherein the bar is embedded in the plastic body to be supported thereby.
>
> The invention has for an object to provide a reinforcing-bar with one or more spirally-disposed soils secured to the bar so as to provide an extended area of contact adapted to resist strain longitudinally and laterally of the bar and to form a truss within the body of concrete or other plastic material which provides the maximum of supporting strength in the arch or surface to be formed.
>
> Other and further objects and advantages of the invention will be hereinafter set forth, and the novel features thereof defined by the appended claims."

He emphasizes his preferred construction as being "thus providing a construction in which all lateral pull or strain of the coil is avoided, owing to the equalization thereof by the oppositely-extending coils and the tendency of the coils to move or flatten toward the face of the bar resisted." He mentions a preferred means of securing the coils to the bar by setting the coils within kerfs and holding them therein by means of integral spurs "which are forced downward upon the coils when inserted and permanently retain them in position."

It was urged at the trial that one of the special advantages of the plaintiff's construction was its collapsibility and therefore its suitability for transportation from the place of manufacture to the place of use. The structure of the patent is not collapsible. The quotations above indicate it. If the integral spurs are *forced* down upon the coils and *permanently* retain them in position there

can be no collapsibility. The bar to which the coils are attached is a spacing member in its relation to the plaintiff's structure. In its relation to the concrete structure it may or may not be a reinforcing member dependent upon an engineer's determination of stress to be relieved. The reinforcing bar of the patent, however, embraces both the helicoidal coil and the bar just referred to which may be called the spacing member. The collapsibility was not a feature of the structure of the plaintiff under the original patent is clear because the first two claims of that patent require the spiral coil to be "rigidly secured" to the bar and none of the other claims indicate a different relation between the two. In the re-issued patent the first two claims of the original patent have been eliminated. It will be noticed in reading the three claims of the re-issued patent which are in suit, as hereinafter quoted, that the first two require the spiral coil to be "permanently secured" to the bar, and that the third indicates it because it required the overlapping spur to retain beneath it a convolution of the coil. The three claims are as follows:

> "1. A concrete reinforcing consisting of a bar having a plurality of integral spurs, and a spiral coil permanently secured thereto by having the spurs bent down on the several coils, the coils extending beyond and free of the bar at the opposite side therefrom to the securing point.
>
> 2. A concrete reinforcing consisting of a bar having integral means to secure a coil thereto, and a spiral coil permanently secured to the bar in each convolution and extended beyond and free of said bar at the opposite side therefrom to the securing point.
>
> 3. A reinforcing-bar provided upon one edge with a series of kerfs each having an integral overlapping spur, and a coil disposed in said kerfs, each convolution thereof being retained beneath one of said spurs."

Being satisfied that collapsibility was not a feature of the device of the first patent, the court is equally satisfied that if collapsibility may be found to be disclosed in the re-issued patent, then the re-issued patent was broader than the original and should not have been granted. The evidence clearly discloses that intervening rights have arisen; therefore the re-issued patent must be held invalid as being broader than the original to the extent at least that there is a disclosure therein of collapsibility in the plaintiff's structure.

However, it is unnecessary to decide this case upon the question as to whether or not the plaintiff's structure is collapsible or whether it is rigid or otherwise permanent in the relations between the coil and the bar. This court is satisfied that there was no invention upon the part of the plaintiff. There is no suggestion throughout the record that the bar of the plaintiff has met any predetermined engineering demands in concrete construction. Helicoidal bars, wires, hoops and methods of attaching the same to bars for the purpose of keeping apart the several convolutions thereof are old in the art. The attachment of wire to bars or sheets of metal by overlapping spurs of kerfs is old. The patent has no novelty.

It is unnecessary to set forth with any degree of particularity the various patents and publications which have led the court to this conclusion. However, much light may be thrown upon the subject by referring to "Experimental Researches on Reinforced Concrete" by Armand Considere, translated into English and published in New York in 1903.

In the view this court has taken in this case, it is unnecessary to dwell on the subject of infringement. If by any possibility, the patent could be held valid, it is most limited in its scope. If valid and thus limited, there has been no infringement.

The bill of complaint must be dismissed at plaintiff's cost.

APPENDIX D.

VANDENBURGH *v.* ELECTRIC WELDING CO.

(Circuit Court of Appeals, Third Circuit. February 19, 1920. Rehearing Denied March 29, 1920.)

No. 2479.

1. PATENTS (Key) 328—PATENT FOR REINFORCING BAR LIMITED AND NOT INFRINGED.

The Vandenburgh patent, No. 841,741, for a reinforcing bar for use in concrete work, *held* limited by the prior art to a bar with kerfs or cuts, in which the attached coil is placed and a tongue or spur, overlapping the kerf and holding the coil in place; and, as so limited, not infringed.

2. PATENTS (Key) 328—REISSUE PATENT FOR REINFORCING BAR HELD INVALID AS NOT WARRANTED BY ORIGINAL PATENT.

Claims 1 and 2 of the Vandenburgh reissue patent, No. 14,182, for reinforcing bars for use in concrete work, *held* invalid, as not warranted by the original patent.

Appeal from the District Court of the United States for the Western District of Pennsylvania; Charles P. Orr, Judge.

Suit by George E. Vandenburgh against the Electric Welding Company. From a decree dismissing the bill, plaintiff appeals. Affirmed.

Carlos P. Griffin, of San Francisco, Cal., for appellant.

Frederick W. Winter, of Pittsburgh, Pa., for appellee.

Before BUFFINGTON and WOOLLEY, Circuit Judges, and MORRIS, District Judge.

(Key)—For other cases see same topic & KEY-NUMBER in all Key-Numbered Digests & Indexes.

BUFFINGTON, *Circuit Judge.* On January 22, 1907, there was issued to George E. Vandenburgh patent No. 841,741, for a reinforcing bar. On August 15, 1916, a reissue of said patent was granted, No. 14,182. This reissue made no change from the original, either in the specification, in the figures, or in claim 3, here in issue; but claims 1 and 2, here in issue, are new. Vandenburgh having charged the Electric Welding Company with infringing said three claims of the reissue, and the court below having, on final hearing, held the claims invalid and dismissed the bill, Vandenburgh took this appeal.

(1) After argument and due consideration, we are of opinion the court below made no error in dismissing the bill. The grounds of our conclusion we now record:

The combination device, which Vandenburgh disclosed in his specification, was a particular type of attachments of coils and reinforcing bars in concrete work. Both coils of wire and reinforcing bars to which such coils were attached were prior devices in use in that art. Taking these two familiar devices of coil and bar, Vandenburgh disclosed a new way of attaching the coil and bar for use in the concrete reinforcing art, to wit, by the use of kerf or cut in the side of the bar in which the coil was placed, and a tongue or spur overlapping the kerf, which spur, when bent down, served to hold the coil in place. This seating of the bar in the kerf cut and keeping it in place by the overlapping spur or tongue, Vandenburgh set forth in his specification as follows:

> "As a preferred means of securing the coils to the bar I have shown a series of kerfs 8 in *one face of the bar* inclined away from the center of the bar toward the opposite ends thereof, and the coils are seated within these kerfs and *held therein* by means of the integral spurs 9, *which are forced downward*

upon the coils when inserted and *permanently retain them in position*"

—and embodied in his third claim as follows:

> "A reinforcing bar provided upon *one end* with a series of kerfs, each having an integral overlapping spur, and a coil disposed in said kerfs; each convolution thereof being retained beneath one of said spurs."

Now, while a kerf or cut in the edge of a bar was a common mechanical expedient, no one had used it in concrete reinforcement until Vandenburgh disclosed his device. But, other than a combination using a kerf, Vandenburgh disclosed nothing new in his specification. Finding his kerfed combination novel, regarding it as useful, and assuming for present purposes, as we will, that it embodied invention, there is no reason for regarding it as other than a narrow contribution to the art of a specific type of coil and bar attachment. In the nine years between its grant and the filing of this bill, Vandenburgh's patent made no impress in the art, and we give the patentee the full measure of his disclosure and the protection of his claim by limiting his field of monopoly to a reinforcing bar with a kerf and an integral overlapping spur, as embodied in his third claim.

Thus limited, such claim is not infringed by the defendant's structure. It has coils, which, as we have seen, are old; it has a reinforcing bar, which is also old; and the two are attached, but the crux is: How are they attached? Are they attached by a kerf cut? Mere attachment of bar and coil were old, and Vandenburgh's advance consisted, not in bar and coil attachment generally, but in the kerf and spur attachment. This form of attachment being the gist of Vandenburgh's patent, it must be the test of defendant's infringement, or, in

other words, does the defendant use the kerf and spur attachment of Vandenburgh's claim? In our judgment, it does not. The kerf of the claim is upon one end, which can only mean one edge of the reinforcing bar, which end or edge cut is the only form of bar and kerf cut disclosed by Vandenburgh, and his bar is a flat bar, and the kerfs are cut diagonally into the edge of such flat bar. On the other hand, the bar of the defendant's device consists of a channel bar and there is no cut of any kind in the end or edge of either of the channel sides. On the contrary, attachment in defendant's bar is made by using the back body of the central bar of the channel and stamping a tongue out of said solid central back portion, and then winding such tongue over the coil, which does not rest in the body of the bar but outside of it.

It will thus be seen the defendant's coil is not restrained by the body of the bar, or by the sides of any cut in the body of the bar, but is restrained wholly by the tongue, which surrounds and holds the coil. In Vandenburgh's structure, the tongue or spur simply holds the coil in the kerf recess, and it is the cut sides of the kerf which hold the coil in place. If Vandenburgh's spur or tongue broke, the kerf sides would still have a coil-restraining function. But in defendant's device the sides of the cut in the body structure do not restrain or hold the coil; that is the function of the stamped cut, coil-encircling tongue. If defendant's tongue broke, there would be absolutely no coil and bar attachment or restraint, for the cut in the bar has no functional purpose whatever, save to create a tongue, and the attaching, functional agency of defendant's tongue would be the same if no cut in the reinforcing bar were made but the tongue was made by riveting it on the reinforcing bar. For these reasons we are clear defendant's structure does not infringe the third claim.

(2) Seeing, then, that the kerf and overlapping spur in combination constituted the real invention of Vanden-

burgh, and that he disclosed no other form of attachment, it is quite evident he was not entitled to broad claims of the generic type, which he secured on the reissue in claims 1 and 2. Kerf and overlapping spurs are not embodied in these claims, and it is manifest that these claims, unrestricted by the limitation of kerfs and spur, were only added 9 years after his patent was granted, to make infringers of those who used other forms of attachment than the kerf and overlapping spur, which alone Vandenburgh disclosed, and which were the sole warrant for the grant of his patent.

Such being the case, it is clear the court below was not in error in dismissing the bill.

APPENDIX E.

IN THE

DISTRICT COURT OF THE UNITED STATES,

NORTHERN DISTRICT OF OHIO—EASTERN DIVISION.

GEORGE E. VANDENBURGH, *Complainant,* *vs.* TRUSCON STEEL COMPANY, *Defendant.*	In Equity. No. 500.

WESTENHAVER, *District Judge.*

Plaintiff's bill is in the usual form, charging infringement by defendant of United States Re-issue Letters Patent No. 14,182 granted to him August 15, 1916, being a re-issue of letters Patent No. 841,471, granted January 22, 1907. The subject of the patent is for a reinforcing bar to be used in concrete construction. On this hearing, claims 1 and 3 only are in issue and relied on. The defenses are invalidity for lack of invention, and non-infringement.

This re-issue patent has been the subject of previous litigation in the Second and Third Circuits. Circuit Judge Hough, May 13th, 1918, held, in effect, that claims 1 and 2 of the re-issue patent are invalid if the change made therein from the words "rigidly secured" of the original patent, to "permanently secured" of the re-issue claims embody a different meaning than the original; that claim 3 was not infringed by a construction substantially, if not exactly, similar to the construction here involved; and, finally, that the only invention disclosed by

the specifications is the exact construction described and pictured in Figs. 1 and 6. On appeal, the Circuit Court of Appeals of the Second Circuit held that claims 1 and 2 of the re-issue were invalid as too broad, and, in effect, that claim 3 was valid and infringed. The opinion is brief and contains no review of the prior art. It seems to assume that Judge Hough had disposed of the controversy below on the ground only of non-infringement; and seems to assume rather than to attempt to demonstrate that the feature found to be novel as disclosed by the specifications and covered by claim 3 was, in view of the prior art, patentably novel.

In the Third Circuit, District Judge Orr, December 6, 1918, also held that claims 1 and 2 were invalid because too broad, as stated in the opinion of the Court of Appeals, Second Circuit, and also held that claim 3, in view of the prior art, was invalid for lack of invention. On appeal, the Circuit Court of Appeals agreed that claims 1 and 2 were invalid because too broad, but, assuming the validity of claim 3, held that, being limited, as it must, in view of the prior art, to the specific construction therein disclosed and claimed, was not infringed by a construction somewhat different from the construction here involved. We do not understand this opinion as deciding that claim 3 was valid.

On the hearing before me, the controversy was directed almost entirely to the validity of claim 3, although claim 1 was likewise in issue and relied on. In view of the attitude thus assumed by plaintiff's counsel, and the further fact that all the judges who have heretofore considered and passed on claims 1 and 2 have held them to be invalid because too broad, I shall adopt that conclusion without further statement of my reasons than to say that I fully agree both in the conclusion reached and in the reasons given to support it.

Plaintiff's invention is described in his patent as being a reinforcing bar particularly adapted for cement and concrete construction wherein the bar is embedded in the

plastic body to be supported thereby. Fig. 6 discloses an adaptation of this reinforcing bar for column or pillar construction, but no contention is made that this is infringed by defendant. Fig. 4, plaintiff contends, also discloses an adaptation of this reinforcing bar for column construction, and that this is also infringed. This contention is disputed, defendant insisting that Fig. 4 is a detail only of a simple and inexpensive form of the beam construction disclosed in Fig. 1. Assuming without admitting plaintiff's contention to be true, Fig. 4 shows merely a bar with a spiral coil attached to the bar at each convolution by a kerf inclined at an angle to the edge of the bar in such a way as to produce an overlapping integral spur, with this spur hammered down so as to hold rigidly this spiral. Defendant makes and sells a collapsible spiral used in strengthening concrete column or pillars. It consists of a cylindrical spiral of steel wire usually fitted to two bars or spacers, with each convolution of the spiral engaging the spacers at regular intervals. The engagement is so loose fitting that this construction, which is normally stove-pipe-shaped, can be made flat for shipment by moving the metal rods or spacers longitudinally in opposite directions. The method whereby the spiral is attached to the spacer bar is a rectangular notch in the bar, with one or both corners peened or hammered down so as to retain and hold loosely the spiral. Fig. 4 and claim 3 of plaintiff's patent, it is contended, embody and cover this construction; hence the charge of infringement.

The differences in the method of attaching the spiral to the bar, the result accomplished, and the special collapsible mode of operation, between defendant's and plaintiff's construction are such that were I to adopt the limited and narrow construction given to claim 3 by the Third Circuit Court of Appeals, I might likewise dispose of this controversy by holding plaintiff's patent not to be infringed. The inclined kerf method of attachment, with an integral overlapping spur holding the spiral rigidly to the reinforcing bar or spacer, is not the exact method of attachment used by defendant. The kerfs or plaintiff's

patent are required to be cut at an inclined angle to the edge of the bar, thereby creating an integral overlapping spur. This kerf and spur when hammered down, the disclosures of the patent show, were intended to and do hold the spiral rigidly or permanently in place. Defendant's spacing bars have merely a rectangular notch cut at right angles in the spacing bar, and when one or both corners are hammered down, the spiral is not held rigidly or permanently in place, but so loosely as to permit of collapsing. These differences in construction are as substantial as those held not to infringe by the Third Circuit Court of Appeals. This, however, seems to me to be too narrow a ground upon which to dispose of this controversy. It seems to me that if plaintiff's patent is valid because novel and useful in a patentable sense, the charge of infringement could not be repelled by such an insubstantial difference in the method of attachment; particularly as plaintiff's patent suggests this method merely as a preferred method. I have therefore given careful consideration to the charge of infringement.

My conclusion is that if Fig. 4 and claim 3 disclose and cover a concrete reinforcement for columns and pillars of the character now claimed by plaintiff and as is constructed and used by defendant and others, the claim must be held void for want of patentable novelty. My reasons for this conclusion may be briefly stated.

Plaintiff's original application was filed May 8, 1906, and this must be taken as the date of his invention. True, on this hearing he offered some testimony is not sufficient, in my opinion, according to well settled rules, to establish an earlier date. The concrete reinforcement art for columns and pillars was at this date quite well developed, although it had not come into such general and extensive use as it now enjoys. This art had been described in standard technical treatises and disclosed in numerous patents and practical constructions. Armand Considere, a French engineer, in a standard work, translated and published in New York in 1903, teaches all that can now be claimed by plaintiff for his

patent or that is now done by the defendant in the matter of buildings and reinforcing concrete columns, except perhaps the kerf and spur method of attaching the spiral to the spacing or reinforcing bar or bars. This is, in fact, admitted by plaintiff. Hoops, circular bands, and continuous spirals attached to spacing or reinforcing bars as a method of concrete reinforcement for columns or pillars is also disclosed by numerous patents. See Hyatt British Patent No. 1715, 1874, Pelegren French Patent No. 323,457, 1902, Considere United States Patent No. 752,523, 1904, Kieserling & Moller German Patent No. 73004, 1892. Similar constructions are also described and illustrated by Christophe in an article published in 1902, by Marquess in an article published in the Engineering News of New York in 1904, and also in other articles and illustrations in the Engineering News of March 8, 1906, and June 15, 1905.

In some the method of attaching the spiral to the bar is also disclosed. Kieserling & Moller, above noted, discloses a notch in the outer edge of the spacing bar designed to contain and hold the coils. Cummings, U. S. Letters Patent No. 822,587, application dated January 6, 1905, patent date June 6, 1906, shows circular, but not spiral, reinforcing bands for a concrete column attached to the spacer bars by tongues stamped out and then pressed and hammered down over the bands. Christophe, in the article above referred to, discloses notches on the exterior faces of the spacing bars to contain and hold the spiral.

In the metal working arts, numerous patents disclose kerfs or notches, including inclined kerfs with overlapping spurs, as a means of attaching coils or spirals to bars. See the following U. S. Letters Patent: Norwood, No. 601,575, 1896; Clark, No. 589,593, 1897; Carson, No. 278,282; McCall, No. 657,827; Caldwell, No. 682,386, 1901; Prescott & Bennett, No. 447,162, 1891, and Enson, No. 723,632, 1903. Of these patents, Norwood and Eason disclose the inclined kerf with the overlapping integral spur, and Prescott & Bennett discloses a rectangular notch or kerf cut at right angles to the edge of the bar

with the corners hammered down in the manner of defendant's construction.

Thus it appears that all the elements, both of claim 3 of plaintiff's patent and of defendant's construction, are old. Plaintiff's counsel, as already said, admits this to be true, but contends that the reinforced concrete art does not show the kerf and spur in a combination with reinforcing or spacer bar or bars and a continuous spiral, and that this novelty is of a patentable character. This claim of novelty is not true in view of Kieserling & Moller and Christophe's disclosure unless plaintiff's kerf is to be limited to a kerf inclined at such an angle to the edge of the spacer bar as to create and form an integral overlapping spur. It is the latter method only of attachment which is not plainly shown in the prior art. The numerous examples of hoops, circular bands, and continuous spirals in combination with spacing or reinforcing bars found in the concrete art do not explicitly call for an inclined kerf and integral overlapping spur method of attachment. Notches in which to seat and hold the spiral are, however, called for and disclosed. Doubtless, engineers like Considere, Christophe, and Marquess, as well as numerous inventors, assume that any reasonably skilled mechanic or engineer would know the means used and available in the metal working art to accomplish this result, and regarded it as unnecessary to make further disclosures or to give more specific directions. Plaintiff's contention, however, now is that any kind of kerf or notch is covered by his patent, and this claim comes in conflict literally with the existing prior art.

Furthermore, invention cannot, in my opinion, be based on the adaptation of the familiar inclined kerf with an integral overlapping spur of the metal working art to its assumed new use in the concrete reinforcing art. Let it once be assumed, as plaintiff's counsel concedes, that the concrete reinforcing art teaches that the proper method of reinforcing a concrete column or pillar is to use hoops or circular bands, or continuous spirals, spaced at regular intervals around spacer or reinforcing bars and attached hereto, then the problem of making this

attachment becomes no longer one peculiar to the concrete reinforcing art but belongs to the metal working art. The problem is one of the metal worker, and not of the concrete engineer. For this reason, all the means known to the latter art or used by workers therein, must be regarded as the common possession of all persons skilled in either art, and invention cannot be predicated upon a transfer of a device familiar in one to a like use in the other; particularly is this true when no new principle of operation, and no new function is accomplished or performed as a result of the transfer to the new combination.

That invention is not present under these conditions, and does not result from such an adaptation of an old device, is well settled by numerous decisions. See Huebner-Toledo Breweries Co. *vs.* Mathews Gravity Carrier Co. (6 C. C. A.) 253 Fed. 435; Berger Mfg. Co. *vs.* Trussed Concrete Steel Co. (6 C. C. A.) 257 Fed. 741; Van Dorn Iron Works Co. *vs.* Mathis Bros. Co. (6 C. C. A.) 260 Fed. 400, 405-6. The language of Judge Warrington in the case first cited, is equally applicable here. "It must, of course, be conceded that patentable novelty may exist in a combination of old elements; but here the combination claims in suit are lacking in the usual and essential tests of invention. No new function of elements or new method of operation is evolved, and the result achieved is exactly the same as the old one. The settled rule under such facts is that to adapt an old and familiar device to another structure equally old and well known is not to exercise the inventive faculty; it is to apply the skill of the mechanic."

Plaintiff made his alleged invention in an art already crowded and highly developed. The evidence shows that commercially he has contributed nothing whatever to the progress of reinforced concrete construction. No buildings or column were ever constructed by any one under his patent prior to 1916. Two licenses only have been issued by him, the first in the latter part of 1916, under which no business appears to have been done except perhaps to put up one structure, and the other followed the

favorable decision in the Second Circuit. Claim 3 of his patent consequently is only another example of that class of patents described by Mr. Justice Bradley in Atlantic Works *vs.* Brady, 107 U. S. 192, (and recently approved and re-announced by Mr. Justice Clarke in Elyria Iron & Steel Co. *vs.* Railway Supply Co., 242 U. S. 609, in these words: "The process of development in manufactures creates a constant demand for new appliances, which the skill of ordinary head workmen and engineers is generally adequate to devise, and which, indeed, are the natural and proper outgrowth of such development. Each step forward prepares the way for the next, and each is usually taken by spontaneous trials and attempts in a hundred different places. To grant to a single party a monopoly of every slight advance made, except where the exercise of invention, somewhat above ordinary mechanical or engineering skill, is distinctly shown, is unjust in principle and injurious in its consequences." See also Railroad Supply Co. *vs.* Elyria Iron & Steel Co. 244 U. S. 285; Package Mach. Co. *vs.* Johnson Automatic Sealer Co. (6 C. C. A.) 246 Fed. 598, 601; A. Schrader's Son, Inc. vs. Dill Mfg. Co. (6 C. C. A.) 262 Fed. 504.

This conclusion is reached on the assumption that plaintiff's patent and claim 3 discloses what is claimed to be his invention. Personally, however, I agree also with Judge Hough's conclusion that plaintiff's invention was not what he now claims and that what is now claimed is not thereby disclosed, but that the only invention disclosed by his specifications and claims is the exact construction described and pictured in Figs. 1 and 6, as to which no charge of infringement is made.

For these reasons plaintiff's bill will be dismissed at his costs.

D. C. WESTENHAVER,
Judge.

Cleveland, Ohio,
September 23, 1920.

APPENDIX F.

UNITED STATES COURT OF CLAIMS

No. 195-A.

GEORGE E. VANDENBURGH,
Petitioner,

vs.

THE UNITED STATES,
Defendant.

PETITION.

ON REISSUED LETTERS PATENT
No. 14,182.

To the Honorable, the Judges of the United States Court of Claims:

The petition of George E. Vandenburgh respectfully represents:

I. That your petitioner is a citizen of the United States, and is a resident of the City of Sacramento, in the County of Sacramento and State of California, United States of America; and brings this action in his own right.

II. That this petition is filed against the United States under and pursuant to the provisions of the Act of Congress, approved June 25, 1910, entitled, "An Act to Provide Additional Protection for the Owners of Patents of the United States and for Other Purposes," as amended by the Act of Congress, approved July 1, 1918.

III. That heretofore and before the 9th day of May, 1906, your petitioner was the true, original and first inventor of certain new and useful improvements in reinforcing bar, not known or used by others in this country before his invention or discovery thereof, not patented or described in any printed publication in this or any foreign country before his invention or discovery thereof, or more than two years prior to his application for a patent in this country therefor, not patented in any country foreign to the United States on an application filed by him or his legal representatives or assigns more than twelve months prior to said application for patent in this country, and not in public use or on sale in this country for more than two years prior to his said application for patent in this country; and so being the true, original and first inventor thereof, your petitioner made due application, according to law, for Letters Patent of the United States therefor; and on the 22nd day of January, 1907, upon his said application and in conformity to law, Letters Patent, in the name of the United States of America, dated January 22nd, 1907, No. 841,741, duly executed and recorded, sealed with the seal of the Patent Office and signed by the Commissioner of Patents, according to law, were duly granted to your petitioner, whereby there was granted and secured or intended to be granted and secured to your petitioner, his heirs and assigns, for the term of seventeen years from and after the said 22nd day of January, 1907, the exclusive right to make, use and vend throughout the United States and the Territories thereof, the invention aforesaid, a description whereof, in the words of your petitioner, was given in the schedule annexed to said Letters Patent and made a part thereof, as by reference to said Letters Patent, or to a duly authenticated copy thereof, here in court to be produced, will more fully and at large appear.

IV. That thereafter it appeared to your petitioner that said Letters Patent were defective and insufficient

by reason of the fact that your petitioner had claimed more than he had a right to claim as new, and by reason of the fact that the verbiage of the claims was defective in not precisely corresponding with the terms of the specifications, whereupon on, to wit, July 1st, 1916, being then sole owner of all right, title and interest in said patent, your petitioner prepared in accordance with law and filed an application with the Commissioner of Patents of the United States to have said patent reissued; that thereafter due proceedings were had by the United States Patent Office, and in regular course said patent was reissued and was delivered to your petitioner granting to him rights of the same effect and operation in law as if the same had been originally filed in such correct form, and that the errors or mistakes in the original patent arose by accident or inadvertence and without fraudulent or deceptive intention on the part of your petitioner.

V. That said Reissued Letters Patent were granted in due form of law under the seal of the United States Patent, and were signed by the Acting Commissioner of Patents, and bear date of August 15th, 1916, under the number 14,182, and that all requisite proceedings were had prior to the reissue of said Letters Patent which are required by law in such cases, and profert is hereby made of said reissued Letters Patent, or a certified copy thereof, for a more complete and full description of the invention covered thereby; and that your petitioner is now the sole owner of all right, title and interest to said reissued Letters Patent.

VI. That your petitioner has never assigned, nor granted any right, title or interest, whatsoever, in or to the said invention, or in or to said reissued Letters Patent No. 14,182, but still holds and owns the entire exclusive right, title and interest in and to said invention and Letters Patent, and in and to all rights of action for the past or future infringement of said reissued Letters Patent.

VII. That your petitioner is advised and believes, and therefore avers, that said reissued Letters Patent No. 14,182, are valid and effective in law to secure to your petitioner the exclusive rights and privileges thereby granted; that so far as your petitioner is informed and believes, the public generally have acquiesced in your petitioner's rights under said reissued Letters Patent; that your petitioner is entitled to the exclusive use and enjoyment of said invention and of said reissued Letters Patent; and that, but for the infringement hereinafter complained of and those of like character, your petitioner would have been and would now be, in the undisturbed possession, use and enjoyment of the said invention and of the said exclusive rights and privileges and in receipt of the profits of the same.

VIII. That the invention covered and claimed in said reissued Letters Patent No. 14,182 was not invented or discovered by your petitioner, while an employee of the Government of the United States, nor during the time of his employment or service by or for the Government of the United States, nor is your petitioner now in the employment or service of the Government of the United States.

IX. That your petitioner is informed and believes, and therefore avers, that the United States, through the officers and employees of its War and Navy Departments, and otherwise, has, since the grant of said reissued Letters Patent No. 14,182, and before the filing of this petition, without the license of your petitioner, or without lawful right, made and constructed or caused to be made and constructed and used, or caused to be used, reinforcing bars containing and embodying the invention covered and claimed by said reissued Letters Patent No. 14,182, and particularly by Claims 1, 2, 3, 4 and 5, thereof, in violation and infringement of said reissued Letters Patent and of the rights of your petitioner thereunder; that such unlawful and unauthorized use of your petitioner's

said invention has resulted in great injury, damage and loss to your petitioner, to wit, as your petitioner is informed and believes, and therefore avers, the aggregate sum of Five hundred thousand dollars ($500,000) damages, which sum is still due your petitioner, no part thereof having been paid, and which sum or such reasonable compensation for the use by the United States of your petitioner's said invention as this Honorable Court may find to be due your petitioner, your petitioner avers he is fully entitled to recover from the United States, after allowing all credits and offsets.

X. That your petitioner's said claim for compensation for the use of his said invention is not based on the use by the United States of any article, apparatus or method, owned, leased, used or in the possession of the United States prior to June 25th, 1910.

XI. That your petitioner has not sold or transferred his said claim or any part of the same to any person or persons; that no action has been taken on this claim in Congress or in any of the departments; that your petitioner has not, in any way, voluntarily aided, abetted or given encouragement in rebellion against the Government of the United States.

XII. That the facts stated in this petition are true.

WHEREFORE, your petitioner prays judgment in his favor against the United States, for the sum of Five hundred thousand dollars ($500,000) and for such other and further relief as to the Court may seem just.

GEORGE E. VANDENBURGH.

O. ELLERY EDWARDS,
Woolworth Building,
New York City,
Attorney and of Counsel for Petitioner.

STATE OF CALIFORNIA, } ss.:
County of Sacramento, }

GEORGE E. VANDENBURGH, being duly sworn, according to law, says: that he is the petitioner named in the foregoing petition by him subscribed; that he has read the said petition and knows the contents thereof; that the said petition is true of his own knowledge, except as to matters therein stated to be on information and belief, and as to such matters he verily believes it to be true.

GEORGE E. VANDENBURGH.

Subscribed and sworn to before me this 4th day of June, 1921.

R. H. MAYHARD,
Notary Public.

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WM. R. ST

IN THE

Supreme Court

of the

United States

[redacted]
now
No. 273 October Term, 1922

GEORGE E. VANDENBURGH,
Petitioner-Complainant,

vs.

TRUSCON STEEL COMPANY,
a Corporation,
Respondant-Defendant.

Brief of Petitioner

On writ of certiorari to the United States Circuit Court of Appeals in and for the Sixth Circuit and the U. S. District Court for the Northern District of Ohio.

CARLOS P. GRIFFIN,
Attorney for Petitioner,
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IN THE

Supreme Court

of the

United States

GEORGE E. VANDENBURGH,
Petitioner-Complainant,

vs.

TRUSCON STEEL COMPANY,
a Corporation,
Respondant-Defendant.

BRIEF FOR PETITIONER.

PRELIMINARY STATEMENT.

May it please this Honorable Court:

This case comes up for hearing before this Honorable Court from a decision of the Circuit Court of Appeals for the Sixth Circuit upon a writ of certiorari granted by this Honorable Court. The case involves reissued patent No. 14,182 granted by the Patent Office August 15, 1916, original No. 841,741 dated January 22, 1907, on a concrete reinforcement consisting of a coil of wire with longitudinal spac-

ing or reinforcing bars having integral spurs for holding the coils in place.

The suit is brought by the patentee himself and is one of several such suits brought against other defendants on the same patent for precisely similar infringements.

In the case of Vandenburgh vs. Concrete Steel Company, reported at 258 Federal Rep. 143, the patent has been sustained as to claims 3 and 5 by the Circuit Court of Appeals for the Second Circuit, an application for certiorari thereon being denied by this Hon. Court. Thereafter it was reported by the Master that something over Sixteen Thousand ($16,000) Dollars is due the plaintiff. The report of the Master was confirmed by the District Court and by the Circuit Court of Appeals for the Second Circuit, from which decision another writ of certiorari was asked which was granted by this Honorable Court and which case it is assumed will be heard just prior to this one. The last decision will be found at 278 Fed. R. 607.

In the case of Vandenburgh vs. Electric Welding Company, 263 Fed. 95, the Circuit Court of Appeals at Philadelphia holds claim 3 valid in the following words: **"Finding his kerfed combination novel, regarding it as useful, and assuming for present purposes, as we will, that it embodied invention, there is no reason for regarding it as other than a narrow contribution to the art of a specific type of coil and bar attachment."**

The Circuit Court for the Sixth Circuit has the following to say concerning the validity of claim 3: "It is true that this particular method of attaching the loop to the upright was new as applied to the art of metal reinforced concrete. . . . We recognize that the use of diagonal kerf and overhanging spur method of connection in a non-analogous art did not anticipate the combination claim in question (3). . . Our conclusion is that, assuming for the purposes of this opinion that the claim in question involves some measure of invention, it is so narrow as to be practically limited to the specific method of fastening disclosed, and that it cannot be extended to cover defendant's method." This makes extended notice of the alleged anticipations in this case unnecessary, the references having been exhaustively reviewed in every court previously.

THE ERRORS ASSIGNED.

The errors assigned in the decision in the court below are as follows:

(1) In adopting "without further statement of . . . reasons" previous decisions as to the invalidity of claim 1.

(2) In not adopting the decisions of the Courts of Appeal of the Second and Third Circuits as to the validity of claim 3.

(3) In holding that the "kerfs of plaintiff's patent are required to be cut at an inclined angle to the edge of the bar."

(4) In holding that the kerf and spur . . . were intended to and do hold the spiral rigidly or permanently in place.

(5) In holding that defendant's spiral is not held rigidly or permanently in place.

(6) In holding claim 1 void.

(7) In holding claim 3 "void for want of patentable novelty."

(8) In holding uncontradicted testimony of two witnesses insufficient to establish the date of plaintiff's original invention.

(9) In holding that combination claims are void because their several elements are old in other arts and locations.

(10) In holding that patents from the metal working arts are pertinent to concrete reinforcing.

(11) In holding that any patent in the record negatives the patentable novelty of either claims 1 or 3 and especially that Kieserling, Moller and Christophe do not do so.

(12) In holding that "Considere, Christophe or Marquess as well as numerous inventors" disclosed or showed anything which anticipates claims 1 or 3.

(13) In holding that plaintiff's claim 3 "comes in conflict literally with the existing prior art."

(14) In holding that "no new function is accomplished or performed as a result . . . of the new combination" of claim 3.

(15) In holding that "no new function of elements or new method of operation is involved, and the result achieved exactly the same as in the old one."

(16) In holding that plaintiff's inability to commercially work his invention more than he has is in any way a bar to recovery on his patent.

(17) In holding that the only invention of plaintiff is "the exact construction described and pictured in Figs. 1 and 6."

(18) In not holding claims 1 and 3 valid and infringed.

(19) In dismissing the complaint at the cost of plaintiff.

Owing to the fact that the certiorari writ had been granted in the case of Vandenburgh vs. Concrete Steel Company, and owing to the fact that the patent will expire January 22nd, 1924, a petition for rehearing was not presented to the Circuit Court of Appeals for the Sixth Circuit, although it was prepared, and one matter that was to be presented in it is asked to be considered here, that is, that the

printed publications offered in evidence were insufficiently proven and should be excluded.

THE ISSUE.

The invention as stated above consists of a coil of wire secured to a longitudinal bar by means of prongs integral with the bars. It may be used for all kinds of concrete reinforcing, but the defendant sells its reinforcing for use in columns.

The art shows the invention to be a pioneer patent in its limited field, a cloud of patents on the same subject matter following closely after Vandenburgh.

The claims in issue herein are as follows:

> 1. A concrete reinforcing consisting of a bar having a plurality of integral spurs, and a spiral coil permanently secured thereto by having the spurs bent down on the several coils, the coils extending beyond and free of the bar at the opposite side therefrom to the securing point.
>
> 3. A reinforcing bar provided upon one edge with a series of kerfs each having an integral over-lapping spur, and a coil disposed in said kerfs, each convolution thereof being retained beneath one of said spurs.

The original claims these replaced are as follows:

> 1. In a reinforcing-bar, a spiral coil rigidly secured thereto at two points in each convolution thereof and extended beyond and free of said bar at the opposite side therefrom to the securing point.
>
> 3. A reinforcing bar provided upon one end with a series of kerfs each having an integral overlapping spur, and a coil disposed in said

kerfs, each convolution thereof being retained beneath one of said spurs.

The language of the claims is clear beyond the average patent claim, but since much has been made of a supposed difference between the patent and defendant's construction, the following excerpts from the reissue will be made:

> "The invention has for an object to provide a reinforcing bar with one or more spirally disposed coils secured to the bar so as to provide an extended area of contact adapted to resist strain longitudinally and laterally of the bar and to form a truss within the body of concrete or the plastic material which provides the maximum of supporting strength in the arch or surface to be formed."
>
> "In Fig. 6 a modified application of the invention is shown where two of the bars are disposed parallel to each other, with their coils intermeshing, for use in column or girder construction, wherein such a construction provides the maximum of strength in the reinforcing material."

Near the end of the specification the following paragraph is found:

> "It will be seen that this form of bar is very simple and economical in construction while embodying the greatest efficiency in use. This bar, although described in connection with arch and column construction, is adapted for use in any character of metal, reinforced concrete, or cement construction."

The foregoing excerpts show, beyond cavil, that the structure was intended for use in any kind of

concrete structures, without regard to the relative size of the bars used, and that it was particularly applicable to columns is an undisputed fact.

The extracts are word for word the same as are found in the original patent. In fact the drawings of reissue and original are duplicates and the specifications are verbatim the same. See the record for the patent copies, pages 208 and 212.

Much time was spent in the court below in considering whether plaintiff's reinforcing was suitable for beams alone or for columns, but this question has been conclusively settled by the decision of the court below.

However, in addition to the above, even if applicant did not describe the use of the reinforcing in connection with columns, the law is that he is entitled to protection in any field in which it may be applied. Zinn vs. Weiss, 7 Fed. Rep. 916; Union Co. vs. Allen, 14 F. R. 353; Cincinnati Co. vs. Brewing Co., 31 F. R. 472; Potts vs. Creager, 155 U. S. 606; and many others of like import. Justice Brown said in the latter case: "A patentee is entitled to every use of which his invention is susceptible, whether such use be known or unknown to him."

DEFENDANT'S CONCRETE REINFORCING.

Defendant makes and sells a column reinforcing which consists of a coil to which are connected two longitudinally extending bars by means of slots with prongs pressed over the coil elements from both

sides of the slots. See the cuts of defendant's structure, pages 211, 215 and 217 of the record, the latter photograph clearly showing the overlapping prongs in eight different places. The structure is identical with that of the patent save that the slot used is at right angles to the bar while the patent shows diagonal slots. The additional bar in no way changes the invention, nor does it in any way avoid the charge of infringement for the same two bars were used by the Concrete Steel Company and the U. S. Court of Appeals at New York holds that structure to be an infringement of claims 3 and 5 of the patent, both of which are held valid.

The claims (1 and 3) in issue herein are so clear there can be no doubt on the subject of infringement for the defendant's coils are placed in a "slit," "cut," "notch," or "groove" made by "sawing or cutting" in one edge of the bar supporting them, all of which are given as synonymous with kerf in the dictionaries. The coils are also held in place in the notches by pounding down on the corners of the metal adjacent the slots to produce spurs which must be sufficiently bent over the coil elements to hold them in place. If they were not bent over the coil elements, the latter would not be held in place. The spurs can be seen in the photographs. Also see the uncontradicted testimony of Mr. Thayer, record page 115, and that of Mr. Vandenburgh, page 28. The coils, in both instances, are held permanently

in place just exactly as is recited in the body of the original patent, and the fact that defendant uses a small bar in no way changes its character as reinforcing. Neither claim in issue is limited to the diagonal position of the kerf.

THE INVENTION.

At the time of plaintiff's invention, about 1903, see pages 25, 96 and 100 of the record, the concrete art was well developed and the commercial exploitation of the art was beginning, which in a few years (1907) was to be carried on on an enormous scale. Like the majority of patentees, the plaintiff did not immediately file his patent application but did so on May 9, 1906. He was seeking and found a way to improve concrete reinforcing which makes use of spiral coils in conjunction with longitudinal bars to which the coils are secured by prongs integral with the bars. It appears from the record, see pages 73, 116, 118, that such a construction has a number of advantages over the structures which existed prior to plaintiff's invention, see the testimony of defendant's witness, Turneaure, as well as that of Prof. Thayer.

Coils and sundry kinds of fastenings had been used previously but following plaintiff's invention practically all column reinforcing of this type has followed the steps of the plaintiff. Many thousand tons of it have been used and with its striking ad-

vantages over previous forms it is being more largely used all the time, practically only one manufacturer making a spiral of a different character. In fact, it is no secret that the construction is far more valuable than plaintiff ever had any idea of at the time he made the invention.

DECISIONS RELIED ON BY THE COURT BELOW:

The court below upon the question of invention relies upon the cases of Trussed Concrete Steel Company vs. Goldberg, 222 Fed. 506; Day vs. Mt. City Milk Company, 264 Fed. 963, and Berger Company vs. Trussed Concrete Co., 257 Fed. 741.

The Goldberg case is not pertinent to any issue herein. The specification of that patent simply displays the fact that truss reinforced concrete was old, and the fact that this reinforcing is used for truss and column purposes in no way affects the present matter, because with the present case we are concerned wholly with very specific claims on details of a different character brought into a highly developed art by this inventor.

The Day case had to do with the case of a biscuit cutter having the same structure as a brick cutter. In other words, the one machine handled a dough made from flour, whereas the second machine handled a dough made from mud. Obviously the two things were so close in actuality as to make it

probable that one person seeing the biscuit dough machine working would think that it would work equally well with a machine for cutting a dough made from mud. Even that statement is negatived by the Potts vs. Creager case, cited elsewhere.

In the Berger case a metal lathing was attached with prongs to metal studding, in which exactly the same function was then performed as had been previously performed in connection with the art, and the product was a fixed immovable structure no different from the prior art when its parts were assembled.

In the present case the structure is completed prior to being set up and has certain novel mechanical properties independent of the structure in which it is finally assembled, so this case is entirely different from the ones above cited. Here a movable structure having new mechanical functions is produced of old materials and elements. This patent discloses for the first time a spiral concrete reinforcing capable of being self-sustaining, as a complete shop assembled manufactured article and capable of being collapsed for shipment, and for the first time discloses a spiral adequately and properly fastened to the longitudinals at each of the several joints, and in a way that does not weaken the spiral, as well as in a way that makes the fastenings permanent and secure when the concrete is being poured and when in use. For example, Prof. Thayer says:

"To rivet the spirals to the longitudinal would so weaken them as to make it impractical." See page 199 of the record. Prof. Thayer also says: "That the clip fastenings are not as good as the integral prong fastener as they are liable to be displaced." See page 198 of the record. Prof. Thayer also says "That the spiral reinforcing with securing prongs integral with the longitudinals have two very great advantages, the collapsibility of the column for shipping, and the fact that it holds it in its proper position as the concrete is being placed." And he also says "That these spirals have more or less supplanted other forms." See pages 116 and 118 of the record. He also states that "there are not less than five other patents on substantially the same subject matter following the Vandenburgh filing date." See page 117, and these patents are shown in the record from pages 287 to 310.

Prof. Turneaure, defendant's own witness, an expert widely known, says of the spiral reinforcing with the longitudinals having integral prongs for securing the spirals in position "that most of the spirals used today are made that way and supposes it is more economic and convenient to make them that way." He says "They are easily set up in the shop, easily handled, easily shipped and it is easier to get them in a uniform position." He says: "There are some advantages I can think of. I am not a practical builder, so I probably haven't thought of

all of them. There are advantages. There might be over some other construction. I do not have any in mind now, but it is very evidently a good arrangement." Record page 73. None of this testimony is denied.

LAW POINTS INVOLVED.

This case baldly comes before this court upon the following propositions of law:

1. Is the reissue statute to be so narrowly construed as to prevent mistakes unknown to a brick mason, unlettered in the law, from being corrected when those mistakes are brought to his attention by somebody who knew something about the subject and when such corrections narrow the scope of the claims in which they were made?

2. Is a device unpatentable because of its simplicity where it is admitted that the construction substantially displaced all others but one, and where it is far more economical to produce and far better in results than all those preceding it, and where immediately after it came out it was followed by a number of other patents on detail constructions of the same thing?

3. Whether infringement can be avoided by making something slightly different from the thing shown in the drawings of the patent, i. e. a cut at right angles instead of on a diagonal, when the claim

is not particularly limited to that particular form, where the combination is new and where new and useful results are attained as a result of the use of the combination, and where the parts are identical in name, function and number?

4. Whether the uncontradicted testimony of two credible witnesses as to the date of plaintiff's original invention can be utterly disregarded?

5. Whether merely offering, without proof, printed matter bearing a given date is sufficient to anticipate a duly proved patent?

6. Whether printed publications less than two years prior to applicant's filing date are valid references against him?

7. Is a simple invention for that reason unpatentable?

8. Many other points have been urged in different briefs but all seem to be abandoned save the ones here urged, so those have not been touched herein.

THE LAW OF THE CASE.

This court requires no information upon the law points presented, but in order that it may have at hand in this brief the pertinent authorities, they are assembled herein under their proper headings.

LAW POINT NO. 1.

THE REISSUE.

Obviously the reissue statute was enacted for the correction of mistakes in patents. The statute has no other possible excuse for being. Plaintiff states, page 26 of the record, "that upon the suggestion of present counsel on July 1, 1916, he made application to have the patent reissued because there were several mistakes in the wording of some of the claims and one claim was too broad." The change consisted in the addition to claim 1, which did not describe particular and definite fastening means whereby the spirals were secured to the bars of particular and definite words showing that the spirals were secured to the bar by having integral spurs bent down on the several coils. Otherwise the claim is substantially identical save in the omission of the word "rigid" which was on an impossible function in the original. Claim 3 of the original patent recited that the kerfs were upon one "end" of the bar, whereas the correction was obviously to have the claim to read that the kerfs were upon one "edge" of the bar.

This Honorable Court in the case of Abercombie vs. Baldwin, 254 U. S. 198, considered patent 821,580 granted May 22, 1906, and reissued on an application filed September 5, 1913, under No. 13,452. In this case the specification was amended to show that the

water supply tube extended into the chamber of carbide used in the lamp, and an entire new paragraph concerning the operation of the lamp was inserted in the specification. In the 4th claim there was a change made to indicate that the **stirring rod was of a size to restrict** and **control the flow of water** to the carbide. **None of this matter was in the original case** more than by inference, but notwithstanding that the patent was held valid and infringed in an illuminating opinion upon reissue.

In the present case the specification was not changed at all, the drawing is identical in detail. One claim was changed in one word and the first claim had the definite integral spur securing means recited in the original specification added thereto in the place of generic securing means. None of these changes amount to the change of claim 4 in the Baldwin patent.

In the case of Stanley Works vs. Twisted Wire Co., 256 Fed. R. 98, the Circuit Court of Appeals for the Second Circuit held that the Howe patent No. 13,765, a reissue of patent 1,043,771 for Box-strapping did not contain new matter and was not broader notwithstanding the fact that the reissue patent added six claims to the original, and notwithstanding the fact that claim 4 in issue **omitted the raised bearings on the edges of the box strap** found in the original patent claims.

An endeavor in this case will be made to cite only

Supreme Court cases so far as possible, but the above case is too pertinent to pass by.

This Honorable Court in the case of Westinghouse vs. Brake Co., 170 U. S. 537, held that some allowance and delay might be made in the case of an unlearned man seeking to protect himself through a patent. The causes of applicant's delay in not earlier prosecuting his cases are given on page 95 of the record as due to six falls in which he was injured, a bank failure, lack of work, and objections of the bricklayers' union to the introduction of concrete reinforcing in San Francisco where he was at that time. These cases were all as late in being presented to the Patent Office as this inventor in seeking his reissue.

In the case of Eames vs. Andrews, 122 U. S. 40, the patentee added to the reissue specification an air tight connection which had not been mentioned in the original patent and that was held not to broaden the claims, because it would obviously have to be present. This was held to be permissible.

In the present case the addition consists simply and only of words of limitation contained in the original specification.

The case of Motion Picture Co. vs. Laemmle, 214 Fed. R. 788, on reissue 13,329, December 5, 1911, a reissue of 12,037, September 30, 1902, original No. 589,168 of August 31, 1897, the court holds that "Nowhere has it been held that a reissue wherein

the claims are narrowed is void for laches." In that case the narrowed matter consisted of adding the word "perforated" as to the film used in the machine and providing that feeding devices recited in the claims should have "teeth." Practically the same kind of an addition in the present case where the words "integral spurs bent down on the several coils," were added in claim 1.

Many decisions of this court hold that a reissue is for the same invention as the original patent where the reissue claims the invention shown, described or substantially indicated in the original patent. See

Klein vs. Russel, 86 U. S. 433;
Marsh vs. Seymour, 97 U. S. 348;
Morey vs. Lockwood, 75 U. S. 230;
Seymour vs. Osborne, 78 U. S. 516;
Topliff vs. Topliff, 145 U. S. 156;
Abercombie vs. Baldwin, 245 U. S. 198.

This court has also held that verbal differences in a reissue from the original do not invalidate the reissue. Gage vs. Herring, 107 U. S. 640. This disposes of claim 3, and the reissue question.

LAW POINT NO. 2.

PATENTABILITY OF CLAIMS 1 AND 3.

All three Circuit Courts of Appeal concur in admitting the patentability of claim 3; their precise words being set forth at the beginning of this brief.

and what is said of claim 3 applies equally to the broader claim 1.

Claim 1 differs from claim 3 only in the omission of the word "edge." The construction recited by claim 1 contains the same elements, to-wit: the coils, the bar, and the prongs integral with the bar bent down on the coils. It is positively and demonstrably narrower than original claim 1 and only differs slightly in scope from claim 3, so that it should be held valid as well as claim 3. It is a fact that none of the citations in this case show anything of the kind described. There are spirals fastened to the longitudinal by rivets as early as 1874. The Hyatt patent, for example, at page 340 of the record; the Kieserling patent at page 386 of the record was as early as 1894. In that case the spirals were seated in notches but no holding means of any kind was shown. Undoubtedly wires were used at that time to hold the spirals in place.

The U. S. Patent No. 302,664 to Monier of 1884 referred to in the answer at page 16, but not printed in the record, by a stipulation which permits its use, if necessary, shows a spiral wired on longitudinals.

Text books such as Buel and Hill on Reinforced Concrete describe the same kind of a structure as early as 1894, see page 295. Why did everybody wait on this patentee from 1884 to 1907 when he presented his idea? Why is it that defendant does not use these constructions, and why is it that about

eight months following the grant of plaintiff's patent all of the infringers started to making the same thing? Note the defendant's present structure was not used till December, 1910, record page 82. The patents are shown in the record pages 287 to 310.

Prof. Turneaure in the record at page 73, and Prof. Thayer in the record at pages 115, 118, 119, 198, and 203, point out the advantages of the spiral with the integral securing spurs or prongs, they say: "These are more economical, more easily assembled and set up, more easily shipped, more easily placed in a uniform position, that they are collapsible, that the prongs hold the spiral in position as the concrete is being placed, that there is no other method that makes as good a job as the integral securing means, and it would be very expensive to clip all the spirals of a large building to the longitudinals, so expensive as to be impractical." The advantages are so numerous they alone should be sufficient to sustain the patent over the art.

In the case of Diamond Co. vs. Consolidated Rubber Co., 220 U. S. 428, this court says: "It is urged that such capacity (the tipping of the tire) is not recited in the specifications of the patent, and was unknown to Grant . . ." (Here collapsibility of the spiral.)

"It was certainly not an exact repetition of the prior art. . . .

"It possesses such an amount of change from the prior art as to have received the approval of the Patent Office . . .

"Its simplicity should not blind as to its character. . . .

"Knowledge after the event is always easy, and problems once solved present no difficulties. . . .

"It is certainly not necessary that he understand or be able to state the scientific principles involved and it is immaterial whether he can stand a successful examination as to the speculative ideas involved."

"And we may say in passing that the elements of a combination may be all old. In making the combination the inventor has the whole field of mechanics to draw from."

"Decree affirmed."

In this case a long felt want in a full art was brought out and shortly after all the spiral dealers adopted it. The words of this Honorable Court apply with cogent force to this very case in every detail. They could be applied verbatim with the change of "tire" to "reinforcing" to this case.

LAW POINT NO. 3.

IS THERE INFRINGEMENT BY DEFENDANT?

This point is almost trivial, but as it is the one matter on which the court below decides against

plaintiff as to claim 3, it is necessary to treat it with the utmost seriousness.

It is obvious from the reading of claim 5 that the inventor intended to limit claim 5 to the diagonal slots shown and described in his specification. Why was that limitation omitted from claims 1 and 3, if not to make them cover obvious changes? The parts are identical in defendant's construction and in that of the patentee, the work they do is identical and the only difference lies in the cutting of the slot at right angles instead of on a diagonal as indicated in claim 5. Defendant's construction is inoperative unless it has an overhanging spur or prong to bear upon and hold the coils in place. Claim 3 does not set forth how the kerf shall be cut, and as a "kerf" is defined to be "A slit, a cut, a notch, the cut of an axe, saw, or other instrument, a channel or groove made by a saw or cutter, a notch or cut made by sawing or cutting" in a number of different standard dictionaries, it is obvious that the angle of the cut is immaterial and it will be seen at once that the infringement is clear. This court in Union Co. vs. Murphy, 97 U. S., page 125, holds:

"If two devices do the same work in substantially the same way, and accomplish substantially the same result, they are the same even though they differ in name, form or shape." This statement is absolutely on all fours with the conditions of this case. In this case there is only a form difference in

one part, and no form difference with respect to the claims in issue, and structure of the defendant.

In the case of Continental Bag Co. vs. Eastern Co., 210 U. S. 405, this court further holds:

"It is manifest, therefore, that it was not meant to decide that only pioneer patents are entitled to invoke the doctrine of equivalents but that it was decided that the range of equivalents depends upon and varies with the degree of invention."

As to the "paper patent" defense the same decision holds.

"Counsel seems to argue . . . that he (the patentee) is under a sort of moral obligation to see that the public acquires the right to the free use of the invention as soon as conveniently possible. We dissent entirely from the thought thus urged . . ." "It is his absolute property." "We cite them (prior cases) because there is something more than repetition of the same thought by doing so." "It shows that whenever this court has had occasion to speak, it has decided that an inventor receives from the patent the right to exclude others from its use for the time prescribed by the statute. And for that time the public faith is pledged."

In the case of Minerals Separation Co. vs. Butte Co., Justice Clarke, 250 U. S. 336, this court holds:

"Where the patentees came late into the field and their final step was not a long one such a patent must be construed strictly, but candidly and fairly,

to give the patentee the full benefit but not more of the disclosure of their discovery."

If there were differences in function or parts of the patented article and that made by defendant there might be some question as to infringement, but as to the claims in issue herein there is no difference.

LAW POINT NO. 4.

CAN UNCONTRADICTED TESTIMONY BE DISREGARDED?

Plaintiff at page 97 of the record fixes the date of the making of the models of his invention as at a time when he was living at 1803 Oregon Avenue, Washington, D. C., and states that all of the models were left at that place when he went to Califronia.

Benjamin Blethyn, at page 100 of the record, states that he saw the plaintiff working on the models in his shop in 1903. Mr. Blethyn describes the models he had seen and identifies them as being substantially the same as the drawings illustrating the reinforcing shown in the patent—see page 101 of the record.

In the case of Kavanagh vs. Wilson, 70 New York, 177, a leading case and followed by a host of other cases, it was said:

"It is undoubtedly the general rule that when a disinterested witness, who is in no way discredited, testifies to a fact within his own knowledge, which

is not in itself improbable, or in conflict with other evidence, the witness is to be believed and the fact taken as legally established, so that it cannot be disregarded by court or jury."

The case of Philadelphia R. R. vs. Stimpson, 14 Peters 448, it was held that the

"Testimony of the declarations of the inventor prior to the date of the original patent as to its nature and objects, are admissible as res gestae and are proof of the date and origin of his invention."

In the case of Stephens vs. Salisbury, 22 Fed. Case 1284

Verbal statements of the inventor were held to be sufficient to prove the time of invention.

And in the case of Standard Co. vs. Peters Co., 77 Fed. 646

The inventor's oral explanation antedating reduction to practice by defendant was held admissible to overcome priority over a patent.

Here there is no contradictory testimony whatsoever, but the court **simply disregarded what two witnesses** had to say upon the subject, one of them with no interest whatever in the case. It is submitted that plaintiff has sufficiently proved the date of his invention. The production of a model would not in any way confirm his sworn statements. He states when the invention was made and is corroborated by a disinterested witness. That is all

the law requires. Burden of proof does not mean a large number of witnesses.

It is also to be noted here that it is merely the date of the invention the statute refers to which is to be proved, not the time of its reduction to practice to which the statute does not refer. However, the models made were just as complete in small sizes as larger sizes of the same thing would be or could be.

LAW POINT NO. 5.

HOW IS PRINTED MATTER TO BE PROVEN?

It is obvious that printed matter offered in evidence in a case must be proven by some one. Merely offering it in evidence is no proof of its publication or existence upon the day and date that may happen to be printed upon it.

In the case of Reeves vs. Keystone Co., 1 Official Gazette 466, it was held that

"Prior publication must be proved independently of the date imprint on its page." "This date of publication must be independently proved." "As it does not appear that this book was published before the patentee's invention, as evidence it is altogether inconsequential."

In the present case, two articles from the Engineering News, one bearing a date imprint of August 4, 1904, and the other bearing a date imprint

of March 15, 1906, were offered in evidence. These papers were merely submitted to the court with no one to testify to their authenticity nor as to their time of publication. They are obviously wholly irrelevant as testimony, and one is only a couple of months prior to the filing date of the application.

LAW POINT NO. 6.

WHAT PRINTED PUBLICATIONS ARE VALID.

Reference Sec. 4886 of the Revised Statutes provides among other things:

"Any person who has invented or discovered any new and useful art, machine, manufacture or composition of matter, or any new and useful improvements thereof, not known or used by others in this country, before his invention or discovery thereof, and not patented or **described in any printed publication** in this or any foreign country, before his invention or discovery thereof, **or more than two years prior to his application** . . . may . . . obtain a patent therefor."

The two year clause has some purpose and it obviously was put in to require printed publications to be more than two years prior to the application for patent when they are to be a reference against patent claims. If the words do not mean that, they are meaningless. In fact, under well known de-

cisions, the inventor is able to carry his date of invention back more than two years for certain purposes, but cannot, when the references are printed publications carry it back, effectively, more than the given two years. In this case he has carried his date back to 1903 in the construction of his models and is entitled to the two year period antecedent to his making of the patent application.

Von Schmidt vs. Bowers, 80 Fed. 140, holds: "So far as the defense of anticipation is concerned, it must be established as of a date anterior to the patentee's invention or discovery; not merely prior to his application for, or the date of his patent: Revised Statutes 4886, 4920; Plow Co. vs. Starling, 140 U. S. 198; Clark Co. vs. Willimantic Co., 140 U. S. 481, and Loom Co. vs. Higgins, 105 U. S. 592. The fact of invention may be shown by **drawings, sketches, models or any other competent proof.**"

LAW POINT NO. 7.

SIMPLICITY OF THE INVENTION.

Mr. Justice McKenna in speaking of combination claims in Leeds vs. Victor Co., 213 U. S. 301, says:

> "A combination is a union of elements, which may be partly old and partly new or wholly old or wholly new. But whether old or new, the combination is a means an invention distinct from them."

So the age of the elements of the claims cannot be an objection to them.

In Expanded Metal Co. vs. Bradford, 214 U. S. 366, Mr. Justice Day says:

> "It is suggested that Golding's improvement while a step forward, is nevertheless only such as a mechanic skilled in the art with the previous inventions before him, would readily take; and that the invention is devoid of patentable novelty. . . . The fact that an invention seems simple after it is made does not determine the question; if this were the rule, many of the most beneficial patents would be stricken down. It may be safely said that if those skilled in the mechanical arts are working in a given field, and have failed, after repeated efforts, to discover a certain new and useful improvement, that he who makes the discovery has done more than make the obvious improvement which would suggest itself to a mechanic skilled in the art, and is entitled to protection as an invention. . . . We are of the opinion that Golding's method was a substantial improvement."

In order not to burden this record with extended citations of cases it will just be mentioned that Judge Van Fleet once said: "Simplicity in mechanics is not a vice, but rather a virtue—a strength not a weakness;" and this is especially true in the field of invention. The following list of simple inventions given without their citations, but which latter can be found in the brief in the court below if wanted, shows a series of patents held valid which covered exceedingly simple inventions in each instance.

The ordinary "book match" and its enclosing "match box" were both held valid inventions. "A gas burner having inclined perforations" was held to be for a valid invention. A "spectacle case," a "celluloid cap" for pepper and salt dredges, a simple "hand mirror" and a "rubber covered button" were all held good inventions. "A flexible and detachable blade for safety razors," a "shell for protecting and covering the spokes and hub of a wheel" have been held valid inventions. As simple an article of manufacture as "a head muffler" has been held to be for a valid invention.

The "Domes of Silence" used on furniture legs, a "cushion key cap for typewriters," a "cover for cigars," a "newspaper wrapper" having a thread for opening it, and an "antifriction necktie insert" have all been held to be good inventions though simple. The list of patents could be extended to hundreds in which simple inventions have been protected.

LAW POINT NO. 8.

Long lists of authorities have not been given herein, nor have all the various points considered at different stages of this case been elaborately argued. In the first place the addition of authorities by the dozen would not change the law. In the second place the decision below has settled all but certain points and it has been the endeavor of counsel in this case to restrict this brief to only the essential details of the case.

All matters which have been really made an issue by the Court of Appeals have been treated here but all other matters have been passed over as unnecessary to answer in this brief.

CONCLUSION.

In conclusion it is quite apparent from appellee's brief in the court below that it centers its objection to the case as to claim 1 and its reissue principally upon the word "rigidly." This word has many meanings, as many words in the English language have. It is defined in the Webster's dictionary and in other dictionaries as meaning "firmly," "stiffly," "securely," which is from the Latin "rigidus," "rigeus." Any of the meanings given show that the importance placed upon the word "rigidly" by appellee vanish, if the word has its real meaning of "firmly" or "stiffly" securing the coils to the longitudinals applied thereto. Claim 1 is in a far more limited form today than it was in the original patent and should be held valid.

In the case of Towne vs. Eisner, 255 U. S. 418, this court said "A word is not a crystal . . . it is the skin of a living thought and may vary greatly in color and content." To limit the word "rigidly" to **immovable** is to depart from fact as to the possibility of the construction and to depart from fact as to the various dictionary definitions of that word, as well as to depart from the facts of the original specification which did not contain that word.

Appellee lays much stress upon his statement that the patent contained insufficient disclosure of information concerning column hooping. However, this question was completely disposed of by the court below, and decisions of this court have often been made holding that a patentee is entitled to any use to which his construction may be put. But this does not affect claim 3 in any way.

Defendant lays much stress upon this patent as a "mere paper patent." This court has effectually disposed of that question in Continental Bag Co. vs. Eastern Co., 210 U. S. 405, above cited. All patents are printed on paper. The argument is a puerile one.

This case is such a simple one that it seems a marvel that it has required more than five years to obtain that recognition for the inventor which the law provides is his as a matter of right.

The decision below should be reversed for the following reasons:

1. Having obtained a favorable decision in one Circuit Court of Appeals, a patentee should not be compelled to repeatedly litigate the same question on substantially the same testimony in other courts.

2. Claim 1 added the **"integral spurs on the longitudinals bent over the coil elements"** and removed not a single element from the original, thereby more closely limiting that claim, following

Thompson vs. Wooster, 114 U. S. 104, which holds such a change can be made at any time.

3. Claim 3 was changed verbally and not in scope, following Gage vs. Herring, 107 U. S. 640.

4. The patentee is entitled to a broad reading of his claims because he was the first in this art to make use of a type of reinforcing which has practically superseded all others in its field but one.

5. The art shows a development of spiral and longitudinal reinforcing with wire ties in the Monier patent of 1884, then for 23 years there was no commercial change when Vandenburgh's patent was published, whereupon in December, 1907, following the grant of the patent we find defendant using that method and in a short time at least five patentees and many infringers were using it.

6. Vandenburgh explains his delay in applying for the reissue because of sickness and loss of money, and promptly upon learning of the defect sought to reissue the patent.

7. Defendant does not use the things in the art it so glibly asserts are anticipations, but uses the identical structure of the patent, changing an unmentioned slope of the cut holding the coils, giving the Vandenburgh construction the tribute of its imitation as others have done. See Diamond Co. vs. Consolidated Co., 220 U. S. 428, above cited.

8. It is not in the spirit of the patent law nor in

the trend of decisions to seek by technical constructions all possible avenues to defeat a patent, but that wherever there is a doubt (here three Circuit Courts of Appeal have raised that doubt most strongly in favor of the patentee) he is entitled to protection.

"The object of the patent law is to secure to inventors a monopoly of what they have actually invented or discovered, and it ought not to be defeated by too strict and technical adherence to the letter of the statute, or by the application of artificial rules of interpretation." Topliff vs. Topliff, 145 U. S. 156. This case, it is believed, has been followed without deviation since it has been written.

It is most respectfully submitted that the decision of the court below should be reversed and the plaintiff be given the judgment he prays together with costs.

Respectfully submitted,

CARLOS P. GRIFFIN,

Attorney for G. E. Vandenburgh.

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IN THE

Supreme Court of the United States.

CONCRETE STEEL COMPANY,
Petitioner,

v.

GEORGE E. VANDENBURGH,
Plaintiff-Respondent.

October Term, 1921.
No. 674.

CERTIORARI TO THE UNITED STATES CIRCUIT COURT OF APPEALS FOR THE SECOND CIRCUIT.

BRIEF ON BEHALF OF THE PLAINTIFF-RESPONDENT.

Statement of the Case.

This statement is supplemental to that of the petitioner, to which reference will now be made by paragraph and page.

The first paragraph, page 1, is correct in stating that the suit was instituted and tried before Judge Hough, etc., and it is also true that Judge Hough dismissed the bill.

The second paragraph, page 2, is incomplete. From the order dismissing the bill, the plaintiff took an appeal and was successful in part. The lower Court was affirmed as to claims 1 and 2 which were the new claims inserted in the reissue patent and was successful as to claims 3 and 5, which were original claims in the original Letters Patent, and except for a minor clerical correction in claim 3 where "edge" was substituted for "end", an obvious clerical correction, these two claims of the reissue patent are identical with the corresponding claims in the original patent which were numbered 3 and 4. As the defendant used the exact structure of claims 3 and 5 of the Letters Patent here in suit, there could be no question as to infringement, once validity was established. It may be said at the outset that this case will turn on validity and not infringement, should this petition be granted.

The same identical issue was presented to this Court in the petitioner's first petition for a writ of *certiorari* which was denied as found in the memorandum decision at 250 U. S. 664. The petition at bar is the second petition, and is the second identical request as far as this issue is concerned. There is another minor issue, as will be pointed out below, but we believe that this minor issue is of no consequence. We do not think the petitioner will be serious in the contention it makes as to the second issue.

The third paragraph, page 2, fails to state that the recovery of $15,918.33 was based on the figures submitted by the petitioner. It does not lie in its mouth to dispute these figures and they are not disputed. The petitioner sold the infringing articles and admittedly made this profit from them.

The Master, the District Court and the Circuit Court of Appeals have all found this fact and the decree has been entered accordingly.

Sub paragraph A, page 2, is somewhat misleading because the facts are not sufficiently set forth. In this Pennsylvania suit, THE ALLEGED INFRINGING DEVICE IS OF A DIFFERENT FORM FROM THAT INVOLVED HERE. Claims 1, 2 and 3 were involved. The Circuit Court of Appeals for the Third Circuit held that claims 1 and 2 were invalid, claim 3 was VALID BUT NOT INFRINGED, and it did so after a careful analysis which will be quoted below. Claim 5, which is here involved, was not before the Court, and claim 5 alone is sufficient to support the judgment in this case. The plaintiff applied to this Court for relief and its petition for a writ of *certiorari* was denied (253 U. S. 497).

As to the value of claim 3 and the structure therein covered, the Circuit Court of Appeals for the Third Circuit stated as follows, quoting from the record, page 31:

> "Now, while a kerf or cut in the edge of a bar was a common mechanical expedient, no one had used it in concrete reinforcement until Vandenburgh disclosed his device. But, other than a combination using a kerf, Vandenburgh disclosed nothing new in his specification. Finding his kerfed combination novel, regarding it as useful, and assuming for present purposes, as we will, that it embodied invention, there is no reason for regarding it as other than a narrow contribution to the art of a specific type of coil and bar attachment."

In sub paragraph B, page 3, the petitioner fails to state that in the Ohio case only claims 1, 2 and 3

were involved. Claim 5 was not involved and claim 5 is sufficient to sustain the judgment.

Sub paragraph C, page 3, requires no comment.

The prayers for relief in paragraph 5, page 3, are misleading and untrue as will now be pointed out. The first prayer fails to state that the patent has been held valid as to claims 3 and 5 and has been held invalid as to claims 1 and 2.

The second prayer is merely a formal one which will probably not be insisted upon as the defendant's structure is identical with the structure of the patent in suit and with the claims of the patent here in suit.

The third prayer is wrong in point of fact. No CIRCUIT COURT OF APPEALS HAS ANNULLED THE PATENT. Claim 5 stands without question in all decisions of the Appellate Courts which have passed upon them. One Court questions the validity of claim 3, but has nothing against the validity of claim 5.

The fourth prayer is in error in point of fact because the patent was not affirmed on the strength of the testimony of any one witness, but on the records of two cases in two different circuits where the matter of validity was thrashed out at great length.

The fifth prayer relates to a false issue. The matter of reissue cuts no figure here because the only claims involved were original claims which stand as though they were in the original patent as pointed out by the Circuit Court of Appeals in this case at page 17.

The sixth prayer is absurd. There is no reason for limiting by construction the scope of the claims here in suit. They are valid as they stand at their face value. The word "rigid" does not appear in the patent in suit and never appeared except as to

two claims which were eliminated at the time of the reissue. The word "rigid" never appeared in the specification and never appeared in the application as it was when originally filed. As a matter of fact, when the structure is used it is as rigid as it can be made, as will appear below, but this matter is immaterial and irrelevant to any issue in this case.

The seventh prayer is a general one which needs no attention.

In the sixth paragraph of page 4 it is contended that the plaintiff is a poor man. Assuming this to be so the point has no bearing here. The parties hereto have entered into an agreement which has been approved by the District Court by virtue of which the judgment in this case will not be collected and will not be disturbed until this Supreme Court has passed on the matter at bar and determines what shall be done.

The seventh and eighth paragraphs on page 5 are formal and require no discussion.

The Issues.

So far we have answered the petition and shown numerous errors. We have shown that there is nothing in this petition which defines these issues. We will do so for the Court and then extended argument will be unnecessary.

Claim 5 reads as follows:

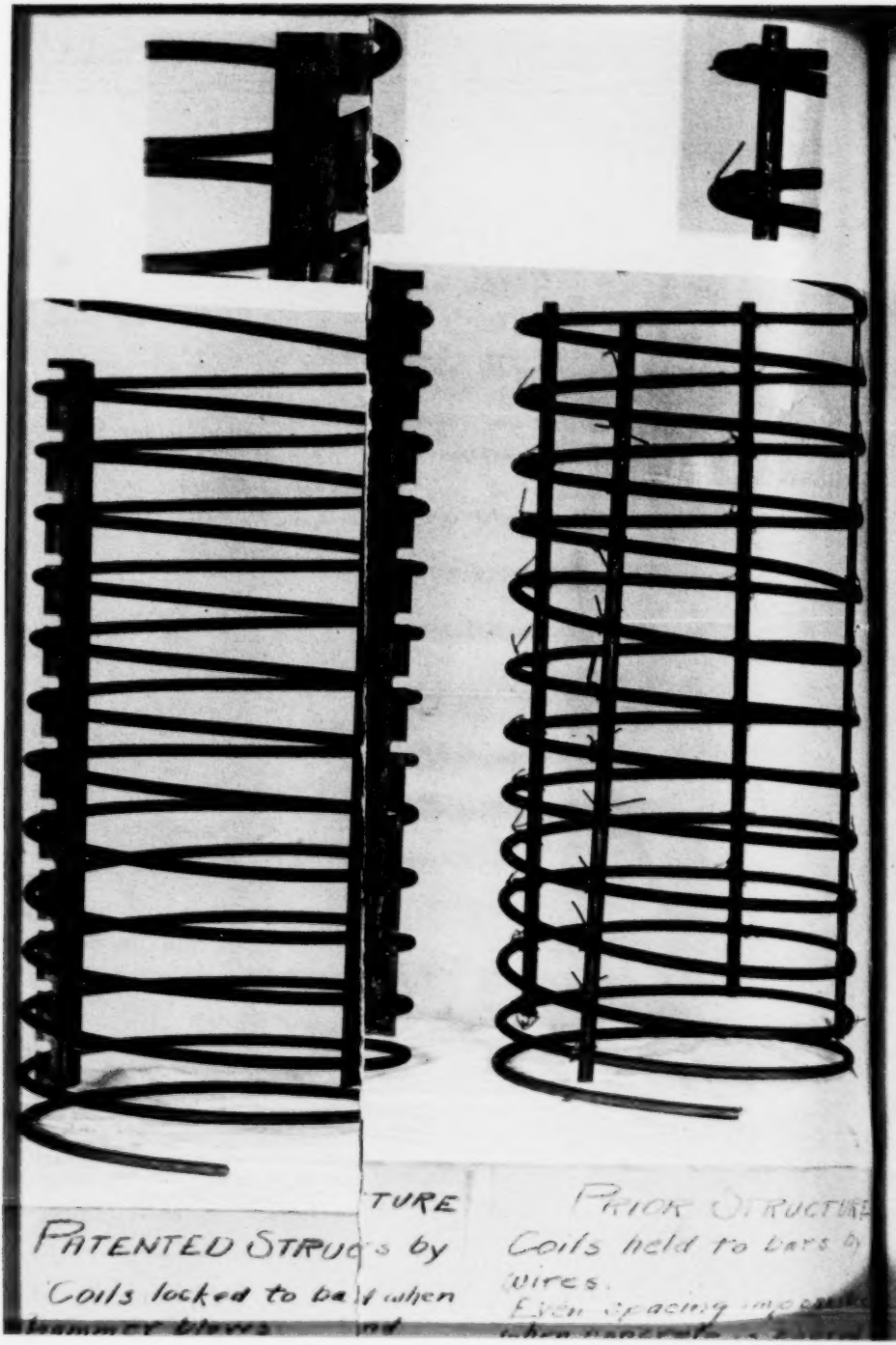
> "5. A reinforcing bar provided upon one edge with a series of kerfs disposed diagonally to the length of the bar, each having an overlapping integral spur projected toward the center of the bar and a coil disposed in said kerfs and retained beneath said spurs."

It will be noted that this claim covers but four elements, to wit:

1. A coil
2. A bar
3. A kerf or notch at one edge of the bar
4. An overlapping spur projected toward the center of the bar at each kerf which is bent down to secure a convolution of the coil.

These elements, in the combination stated, with all the details of claim 5, are what the defendant used, as above stated, so that infringement is not an issue and we can pass to the question of validity.

In the other cases decided in the Third and Sixth Circuits the respective defendants used different structures from that in the Second Circuit case, which were found not to infringe claim 3. As claim 5 is sufficient for this case, it seems best to simplify the matter before this Court by ignoring claim 3 in the argument of this brief.


TURE
PATENTED STRUC s by
Coils locked to ba l when
hammer blows
PRICK STRUCTUR
Coils held to bars by
wires.
Even spacing impo

The entire relevant prior art, as known to those skilled in the art, is shown at the right of the photograph on the opposite page. There was other paper art which need not be discussed here. It has been amply considered by the Circuit Courts of Appeals that have passed on this case. It is sufficient to say that it is not as good or nearly as good or as practical as the art which was actually used for years, which is shown at the right of the said photograph.

The coils and bars are old, but in the prior art the coils are badly secured to the bars by wires which are difficult to attach and will not hold firmly or rigidly. The coils will slip on the bars. This action cannot be prevented. Therefore, when the spirals are used in concrete columns, the spacing is uneven. This irregularity is increased by pouring and tamping, but no one can tell how much. As a column, like a chain, is no stronger than its weakest part, it is no stronger than the part where the spacing is greatest and no one knows how weak it is or what it will stand. So when this form is used, a surplus of reinforcing is required. The legend underneath tells the story. Now turn to the reinforcing at the left, the patented structure, and look at the even turns of the coil and the way in which it is locked and held. Observe that the turns do not and cannot slip under any circumstances and cannot and do not slip when the concrete is poured and tamped.

Now bear in mind that coils were introduced into this country at least four years before the invention of the patent in suit and were always wired as shown at the right. This hand wiring was the only way and the only commercial way prior to the patent in suit. These are the facts on which

validity has been determined in favor of the patent in suit as to a structure identical with that of the patent. No Court of Appeals has held otherwise. No Court of Appeals has disputed the validity of claim 5.

This question of validity is the serious issue and probably the only issue in this case. It is precisely this issue which was before the Court when it denied the petition for a writ of *certiorari* which was brought by this petitioner, as above stated.

If there be any other issue in this case, it is one which relates to profits. As above stated, $15,918.33 has been allowed and it forms the basis of the judgment of record in this case. The exact figures were furnished by the defendant below, the petitioner here, from its own records and represent the profits which it admits that it made by selling the infringing structures here complained of when infringing the claims 3 and 5 here in suit. The decisions against the petitioner are unanimous, the Master, the District Court, and the Circuit Court of Appeals for the Second Circuit having all found in favor of the plaintiff on this issue. Was this allowance right? If there be a second issue, this is the second issue. These are the only two issues and we will proceed to argue them. In this connection claim 3 may be disregarded and the case stand on claim 5, the validity of which is not disputed by any Appellate Court, and it has been twice affirmed by the Circuit Court of Appeals in the case at bar.

So the issues come down to this: should this Court allow this writ because of the question of validity and because of the question of profits when there has been no conflict of decision as to the validity of the patent as to the specific structure therein set forth and now involved?

POINT I.

The petitioner has no reasonable ground for relief in this court.

The patent is valid as to claim 5 here in suit, for reasons which we will now give.

1. This claim stands exactly as it stood in the original patent, and so all reissue matter is immaterial as to it. Gage *v.* Herring, 100 U. S. 640, 646. No reissue need be further discussed in this brief. We will consider this claim as though there had been no reissue.

2. This claim is valid for the purposes of this litigation. We recognize that only one Court of Appeals has passed on claim 5, but that decision was favorable. Furthermore, there has been no adverse decision as to this claim 5 by a Circuit Court of Appeals, and, on the contrary, the Courts of Appeals for the Third and Sixth Circuits have admitted the validity of this claim 5. Therefore, the weight of decision and authority is all with this claim and that will be sufficient to establish its validity here for the purposes of this petition.

Moreover, if this matter were open, we would show that, although the change in structure is not great, it is vital. It is the last step that counts. For years men had been seeking the right kind of reinforce for columns and not finding it. Finally, the inventor of the patent in suit comes along and makes the necessary changes and the problem is solved in a very simple and satisfactory manner. Quite an analogous case is found reported at 220 U. S. 428, Diamond Rubber Co. of New York *v.* Con-

solidated Rubber Tire Co. (31 Sup. Ct. 444). It appears in this case that there was very slight novelty which amounted to nothing more or less than a slight change in the shape of the rim with a corresponding change in the shape of the tire. This change was not great but it was sufficient to bring in a new function which greatly prolonged the usefulness of the tire. In the case at bar there is a change in the way in which the coil is held to the bar so that the coil is at all times held in the way it ought to be held, evenly and firmly, regardless of the amount of pouring and the force of tamping of concrete about this coil when the forms are poured and tamped. Other cases might be cited, but it is thought that this one is quite sufficient. It is submitted that there is more novelty in the patent here in suit than there was in the Grant patent No. 554,675, there in question. Furthermore, the suit at bar has the same tribute of litigation that this Grant patent had. It differs from the Grant patent in that no Appellate Court has rendered an adverse decision as to the claim here involved.

We have already stated as a fact, that the defendant's structure is identical with the structure of this claim, and as this is so, argument is superfluous.

Passing to this minor issue as to profits, we do not think that the petition is to be taken very seriously. Something is said beginning with page 13. The petitioner is right in saying that the Westinghouse *v.* Wagner case, 225 U. S. 604 (32 Sup. Ct. 691), governs here. Here again we agree. We do, however, differ as to the meaning which is to be attached to this decision. The plaintiff's case is clear.

Paragraphs (*a*) and (*b*) near the top of this decision read as follows:

> "(*a*) Where the infringer has sold or used a patented article, the plaintiff is entitled to recover all of the profits.
>
> (*b*) Where a patent, though using old elements, gives the entire value to the combination, the plaintiff is entitled to recover all the profits."

The plaintiff respectfully contends that he comes under either or both of these paragraphs and the Circuit Court for the Second Circuit agrees with him. Each and every detail of the patent in suit, as to these claims, is found in the petitioner's structure and the petitioner has added nothing of any substance to the structure of the plaintiff. There is no occasion for any apportionment of profits but if there should be any occasion, the burden of proof has shifted to the petitioner and the petitioner has made no effort to meet it. The minor issue of profits, if it be an issue, is so clearly against the petitioner that there is no occasion to argue it. The patent in suit is valuable and infringed and the petition has no reasonable ground of complaint because it must pay for its ill gotten gains.

POINT II.

This is not a case where the precedents justify an intervention of this court.

We have looked through all the reported cases where this Court has granted a petition for a writ of *certiorari* in a patent case, and we find that such cases readily classify themselves. We will give these classes with citations of each.

1. Cases where there have been conflicting decisions in different Circuit Courts of Appeals. This is by far the largest class. The most recent case that we know of in this class is the case of Hildreth *v.* Mastoras, 42 Sup. Ct. 20, decided November 7, 1921. (The United States citation is not known to the respondent.) Another and more famous case is the Diamond Rubber Co. of New York *v.* Consolidated Rubber Tire Co., 220 U. S. 428, above stated; 31 Sup. Ct. 444. Yet a third case, Dowagiac Mfg. Co. *v.* Minnesota M. Plow Co., 235 U. S. 641; 35 Sup. Ct. 221.

2. The second class is where the settling of the question of validity of a patent has been of great importance to the public. The most recent case of this kind, which we found, is Berlin Mills Co. *v.* Proctor & Gamble Co., 41 Sup. Ct. 75, decided December 6, 1920, 254 U. S. 256. Yet another case is that of Mineral Separation *v.* Hyde, 242 U. S. 261; 37 Sup. Ct. 82, and yet another is Carnegie *v.* Cambria, 185 U. S. 403; 22 Sup. Ct. 698.

3. The third class of cases is that where the practice has been settled. One case is that of Westinghouse *v.* Wagner above cited and another is the Dowagiac case, above mentioned, and yet another is that of Brill *v.* Peckham, 189 U. S. 57; 23 Sup. Ct. 562.

4. The last class is that where the law has been interpreted and settled. One of these cases is William Cramp & Sons *v.* International Curtis, 246 U. S. 28; 38 Sup. Ct. 271, and another is Marconi *v.* Simon, 246 U. S. 46; 38 Sup. Ct. 275. Yet another

case is Chapman *v.* Wintroath, 252 U. S. 126; 40 Sup. Ct. 234.

The case at bar comes under none of these heads and is obviously one of the kind of cases that this Court does not find it necessary to consider.

POINT III.

The United States is not entitled to any relief here.

The United States is not a party to this suit. The litigation is private litigation between private parties. It has filed a brief of a page and a half stating in substance that it would like to see this petition granted because the United States has another case pending against it under the same patent, etc.

There is nothing in the brief of the United States which throws any light of any kind whatsoever on any issue in this case. This brief tries to create a prejudice in behalf of one litigant against the other without giving any valid reason for this prejudice. We never before heard of the United States Government trying to intervene in a case so as to create a prejudice without a reason.

We believe that this practice should be discouraged and that this brief should be ignored if, it is filed, and we will treat it in this way and request *this Court* to do the same.

Conclusion.

It is the contention of the respondent that this petition for a writ of *certiorari* should be denied because the petitioner is not entitled to any relief on the merits of the case and because the case belongs to a class as to which this Court has steadfastly refused to intervene, regardless of the merits.

Respectfully,

GEORGE E. VANDENBURGH,
By O. ELLERY EDWARDS,
for Plaintiff-Respondent.

CARLOS P. GRIFFIN,
O. ELLERY EDWARDS,
JOSEPH W. COX,
of Counsel.

Dated New York, January 9th, 1922.

No 7[redacted]273

WM. R. ST

IN THE

Supreme Court of the United States

GEORGE E. VANDENBURGH,
Complainant-Petitioner,

vs.

TRUSCON STEEL COMPANY,
a Corporation,
Defendant-Respondent.

Petition for a Writ of Certiorari and Brief In Support of the Petition

---

CARLOS P. GRIFFIN,
711-714 Pacific Bldg.,
San Francisco, Calif.
For Petitioner.

IN THE

SUPREME COURT

OF THE

UNITED STATES

GEORGE E. VANDENBURGH,
Complainant-Petitioner,

vs.

TRUSCON STEEL COMPANY,
a Corporation,
Defendant-Respondent.

PETITION FOR A WRIT OF CERTIORARI TO THE CIRCUIT COURT OF APPEALS FOR THE SIXTH CIRCUIT.

To the Honorable, The Chief Justice of the United States, and the Associate Justices of the Supreme Court Thereof, Constituting the Supreme Court of the United States.

Your Petitioner, George E. Vandenburgh, a citizen of the United States and a resident of the State of California, respectfully represents:

1. That on or about the 18th day of September, A. D. 1919, he filed his bill of complaint in the United States District Court for the Northern District of Ohio, Eastern Division at Cleveland, Ohio, against the Truscon Steel Company, a corporation duly organized and existing under the laws of the State of Ohio and having a place of business at Youngs-

town in the State of Ohio, alleging the infringement by said corporation of reissue patent No. 14,182 granted to him August 15, 1916.

2. That thereafter, to-wit, on or about June 8, 1920, the trial of said cause was had before Judge Westenhaver at Cleveland, Ohio, whereupon on October 18, 1920, an order was filed dismissing said bill of complaint, whereupon on or about November 5, 1920, an appeal petition to the United States Circuit Court of Appeals for the Sixth Circuit was filed with the Clerk of the United States District Court at Cleveland, Ohio, said appeal petition being accompanied by an assignment of errors which was duly filed, whereupon upon November 6, 1920, an order was entered allowing the appeal and fixing the bond therefor. Thereafter, to-wit, upon December 2, 1920, the bond was duly filed and citation issued. Thereafter, to-wit, on or about November 14, 1920, said appeal was heard at Cincinnati, Ohio, by the Honorable Judges of the United States Circuit Court of Appeals for the Sixth Circuit, whereupon said appeal was duly submitted. Thereafter, to-wit, on or about January 8, 1922, a decision was rendered by said Circuit Court of Appeals ordering the affirmance of the Decree of the United States District Court below, case No. 3587.

3. That on or about the 7th day of February, 1917, your petitioner, George E. Vandenburgh, filed his bill of complaint in the District Court of the United States for the Southern District of New York, against the Concrete Steel Company, a corporation duly organized and existing under the laws

of the State of Delaware, and having a place of business in the City of New York, State of New York.

4. That thereafter the trial of said cause was had, whereupon Judge Hough, who heard said cause ordered the dismissal of said bill of complaint.

5. That thereafter an appeal was taken to the Circuit Court of Appeals for the Second Circuit upon said dismissal, whereupon the decree of dismissal was ordered reversed, and certain claims of said patent were held to be valid and infringed.

6. Such proceedings were then had before the Master as to cause him to report that there was due from Defendant to the Plaintiff the sum of $15,-918.33.

7. Thereafter exceptions were taken and the matter came on to be heard before the United States District Court for the Southern District of New York, whereupon the Master's order was confirmed. Thereupon an appeal was taken to the Honorable Circuit Court of Appeals for the Second Circuit, and such proceedings were had that on the 14th day of December, 1921, the Circuit Court of Appeals affirmed the decision of the District Court in all things.

8. Thereupon defendant, the Concrete Steel Company presented to the Honorable Supreme Court of the United States a petition for a writ of certiorari praying that the decree of the Circuit Court of Appeals for the Second Circuit be sent to the Supreme Court of the United States for revision, whereupon on or about January 30, 1922 said petition was granted by this Honorable Court.

9. Your petitioner further represents that on or about February 13, 1917, he filed his bill of complaint against the Electric Welding Company, a corporation duly organized and existing under the laws of the State of Pennsylvania, having a regular and established place of business in Pittsburgh, Pa., in the United States District Court in and for the Western District of Pennsylvania, at Pittsburgh, Pa., alleging therein the infringement of the same reissued patent No. 14,182.

10. That thereafter such proceedings were had in said United States District Court to cause the dismissal by his Honor, Judge Orr, of said bill of complaint, whereupon an appeal was taken to the United States Circuit Court of Appeals in and for the Third Circuit sitting at Philadelphia, Pa.

11. That said Court of Appeals affirmed the decision of the Court below, stating in its decision *inter alia*: "Finding his kerfed combination novel, regarding it as useful, and assuming for present purposes, as we will, that it embodied invention, there is no reason for regarding it as other than a narrow contribution to the act of a specific type of coil and bar attachment." Whereupon a petition for rehearing was duly filed and denied, after which the petition for certiorari to this Honorable Court was filed and thereafter denied.

12. Your petitioner, George E. Vandenburgh, is informed and believes that the decision of the Circuit Court of Appeals for the Third Circuit as filed is erroneous, and that the decision of the Circuit Court of Appeals for the Sixth Circuit as filed is

erroneous, and this Honorable Court should require the present cause to be certified to it, for its review and determination in accordance with the law in such cases made and provided, under which such review of decisions otherwise final is had to the end that justice may be done this petitioner.

13. Your petitioner respectfully shows that the decision of the Circuit Court of Appeals for the Third Circuit is erroneous for the following reasons:

A. The defendant herein by its solicitor W. F. Guthrie, filed a brief *amicus curiae* in the case of Vandenburgh vs. Electric Welding Company in the Circuit Court of Appeals for the Third Circuit in which it states: "the constructions of the respective defendants are substantially and essentially the same.", and the constructions are identical mechanically.

B. The evidence in the case against the Concrete Steel Company was prepared from the evidence given on an extended trial of the case against the Electric Welding Company herein mentioned and was merely reduced in quantity upon appeal, upon which record the Concrete Steel Company has been held to infringe claims 3 and 5.

C. That the evidence in all of these cases shows that concrete reinforcing consisting of spirals with integral fasteners identical with that of plaintiff's patent have substantially displaced other forms, whereas the Circuit Court of Appeals for the Sixth Circuit finds that "We are not impressed that the

advance in reinforced concrete construction is due in any substantial measure to Vandenburgh's contribution."

D. That said decision is erroneous in not admitting the claims of the Vandenburgh patent to any mechanical equivalency notwithstanding the fact that the construction of the defendant herein is mechanically and identically the same in function.

E. That said decision and the decision of the Circuit Court of Appeals for the Second Circuit in the case against the Concrete Steel Company are erroneous in that claim 1 of said reissued patent is held to be broader than the original claim 1, whereas the fact is that the original claim 1 did not define the means for securing the coils to the longitudinals, and whereas the reissued claims define the securing means as being a part of and integral with the longitudinals and secured thereto by having said integral means bent down upon the spirals.

F. That the record clearly demonstrates the validity of claims 1, 2, 3, and 5 and shows that following the original patent not less than six patents followed the Vandenburgh idea of using integral means on the longitudinals for securing the spirals in place.

G. That said decision is further erroneous in not accepting the uncontradicted testimony of plaintiff and another witness as sufficient to fix the date of invention, neither witness having been in any way impeached.

H. That the decisions of the Court of Appeals for the Sixth and Second Circuits conflict with each

other, the subject matter and the evidence being substantially identical in each case.

I. That said decision is further in error in accepting insufficiently proven printed publications as evidence.

J. That said decision is in error on all the grounds named in the assignment of errors in the court below.

14. *Wherefore your petitioner prays* this Honorable Court to issue its writ of certiorari to the Circuit Court of Appeals for the Sixth Circuit, commanding it to transmit the record of this cause to this Court for the correction of the errors in the decision of the Court of Appeals aforesaid to the end that justice may be done, and such order and decree may be entered in the premises as right and justice may require.

GEORGE E. VANDENBURGH,
Plaintiff-Petitioner.
By CARLOS P. GRIFFIN,
His Counsel.

Brief for Petitioner for Certiorari to the Circuit Court of Appeals for the Sixth Circuit.

No. 3587.

U. S. CIRCUIT COURT OF APPEALS,
SIXTH CIRCUIT.

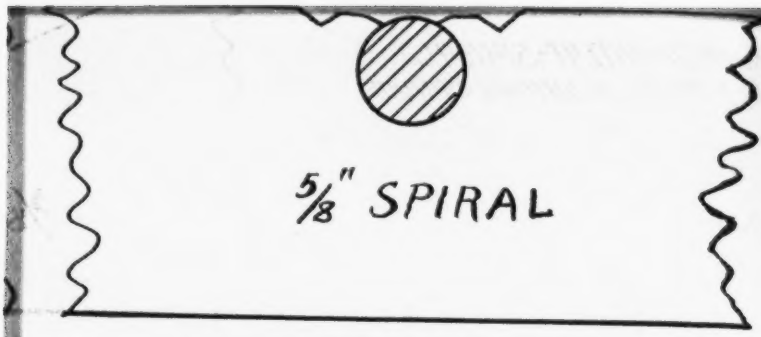
GEORGE E. VANDENBURGH,
Complainant Petitioner,

vs.

TRUSCON STEEL COMPANY,
a Corporation,
Defendant Respondent.

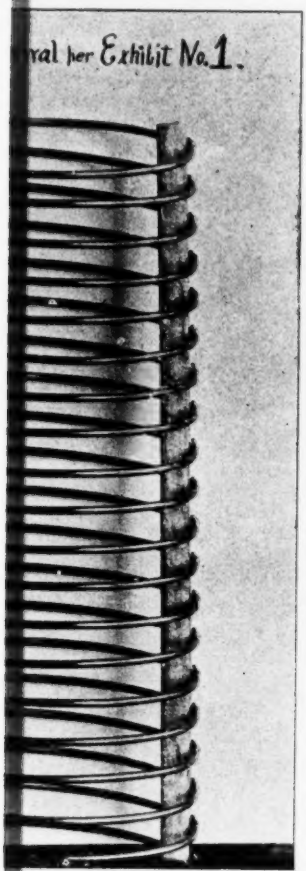
PRELIMINARY STATEMENT.

This case presents a conflict of decisions between the Circuit Courts of Appeal for the Second Circuit and for the Sixth Circuit, on the same patent and the same issues. This conflict has been deemed sufficient to justify granting the petition for certiorari of the Concrete Steel Company, and it is believed by counsel that justice cannot be done unless this petition be also granted. The decision on the last appeal at New York and the Sixth Circuit decision are both printed herein. One holds for infringement and the other against infringement.



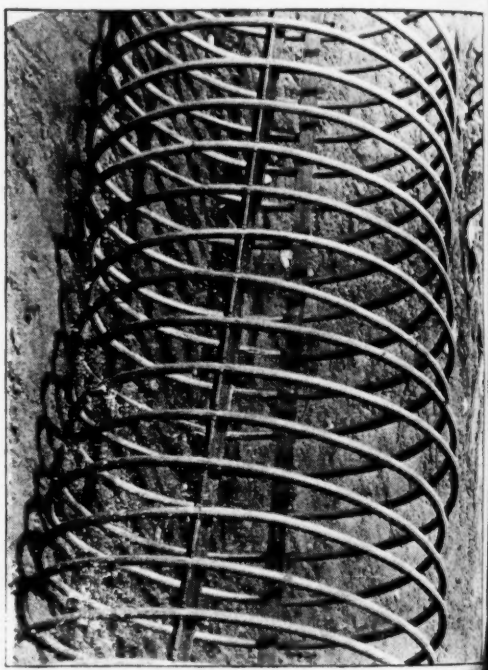
DEFENDANTS PRONGS.

lding Co.—Spiral.



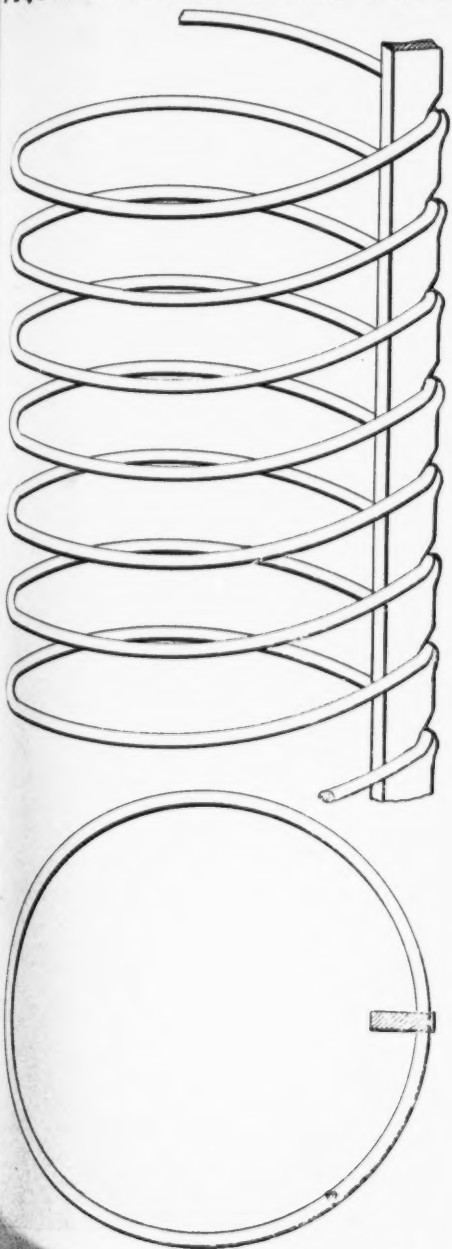
TRUSCON STEEL CO - SPIRAL

Exhibit of Defendant on motion for preliminary injunction

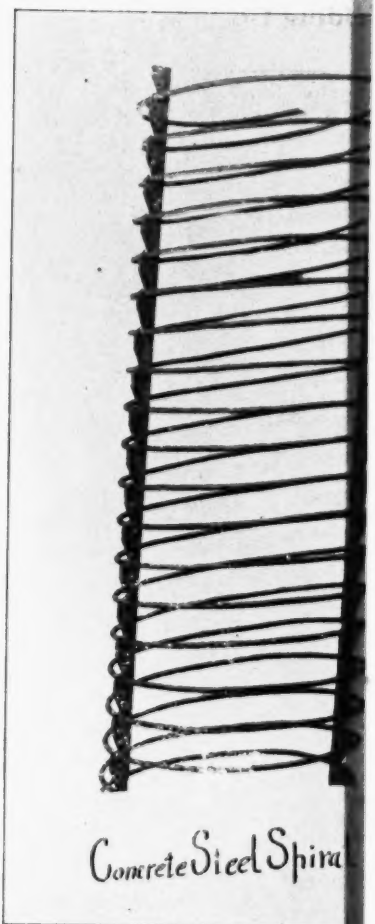


olds coils on one side and prongs on other.

VANDENBURGH-PATENT-SPIRALS
FIGURE 4. WITH ADDITIONAL SPIRALS.



PLAINTIFF



Note each bar has a wide radial plane with no

THE ISSUE.

The construction of the patent consists of a spiral concrete reinforcing secured to longitudinals by prongs thereon bent down on the spirals. Defendant's construction consists of spiral concrete reinforcing secured to the longitudinals by two prongs thereon bent down on the spirals. There is no essential difference between the two, though the shape of the notch in which the spiral is seated varies. One is the full mechanical equivalent of the other in parts and function.

The inserted sheet is copied from the record, showing in addition a drawing taken from full size reinforcing the actual shape of the prongs in each case. This can also be seen on page 217 of the record.

PETITIONER'S PATENT VALID.

The decisions of every Circuit Court of Appeal before which this case has come, have agreed that claim 3 of the patent is valid in the body of the decision, regardless of the action taken in sustaining or reversing the court below. The art clearly shows the development right up to the Vandenburgh patent and then turns over and at least six patents are then found which use the construction he started.

PETITIONER ENTITLED TO BROAD PROTECTION.

It is clear from the art that Vandenburgh is the first to produce the combination of his claims, and the fact that others at once copied him shows that in his limited field he should be broadly protected.

Sly vs. Russell, 189 Fed. 61, Sixth Circuit.

Judge Lurton speaking in cited cases says:

To be entitled to the benefit of the doctrine of equivalents, it is not necessary that the patent shall be a pioneer in the broad sense of that term.

> "In view of this situation, we do not think the patentee should be held limited to the precise form of his crushing agent, in the absence of words of express limitation thereto."
>
> "We do not construe the language of the specification and claim as expressly so limiting it."
>
> Decision by Judge Knappen.

Diamond Co., vs. Consolidated Rubber Co., 220 U. S. 428:

> "It is urged that such capacity (the tipping of the tire) is not recited in the specifications of the patent, and was unknown to Grant. . . ." (Here collapsibility of the spiral.)
>
> "It was certainly not an exact repetition of the prior art. . . .
>
> "It possesses such an amount of change from the prior art as to have received the approval of the Patent Office. . . .
>
> "Its simplicity should not blind as to its character. . . .
>
> "Knowledge after the event is always easy, and problems once solved present no difficulties. . . .
>
> "It is certainly not necessary that he understand or be able to state the scientific principles involved and it is immaterial whether he can stand a successful examination as to the speculative ideas involved."
>
> "And we may say in passing that the elements of a combination may be all old. In making the

combination the inventor has the whole field of mechanics to draw from."

"Decree affirmed."

Some one was entitled to a broad claim in that art, and that some one is the man who gets the patent on the first filed patent application, in this case Vandenburgh. Various degrees of narrow and technical constructions of claims have been used to defeat the patent, Judge Westenhaver says of one of these differences: "These differences in construction are as substantial as those held not to infringe by the Third Circuit Court of Appeals." "This however, seems to me to be too narrow a ground to dispose of this controversy." "If . . . the patent is valid . . . infringement could not be repelled by such an unsubstantial difference." The fact is the two things are substantial mechanical duplicates.

THE REISSUE.

The reissue was made as soon as the plaintiff ascertained the necessity therefor, (see page 26 of the record) present counsel himself telling the inventor of the necessity therefor for the first time about the time of filing the reissue application. The reissue oath will be found at page 458 of the record.

Obvious as the needed corrections were to one looking at the patent for the first time who was skilled in the art, they would not make an impression on a man who is a mason or bricklayer such as this man was.

The delay in making the reissue application is unnecessary to explain for the claims are actually

narrower in the reissue than in the original patent, but he explains his inability to place the reinforcing on the market as due to sickness and loss of money and other causes, see pages 95 and 96 of the record.

That the patentee is not affected by inability to market his invention, is fully decided in

Continental Bag Co. vs. Eastern Co., 210 U. S. 405;

and that narrowed claims are not void for laches has been decided in

Motion Picture Co. vs. Laemmle, 214 Fed. 787, where it was said, "Nowhere has it been held that narrowed claims are void for laches."

ACTION OF THE UNITED STATES SOLICITOR GENERAL.

The Solicitor General for the United States has joined the Concrete Steel Company in asking that the petition be taken up. Apparently the only reason the Solicitor General gives for his action in taking the matter up in the Concrete Steel Company case is given in paragraph 3 of his brief *amicus curiae* which is as follows:

> "That a decision upon the matters set forth in the petition for the writ of certiorari if favorable to petition, that is, the United States, would relieve the United States of the expense and labor of defense as to those claims in the Court of Claims suit, and would thus avoid a multiplicity of suits."

Just why the Solicitor General of the United States should be so solicitous of the interest of the

United States as to intervene in a private suit involving a patent which has already held valid by three Circuit Courts of Appeal is not quite clear, but in any event the plaintiff should at least be given the same hearing that the Solicitor General has been offered and the present petition be granted.

It is believed that this petition should be granted in order that this Honorable Court may once for all settle this controversy, along with the controversy in the Concrete Steel case, wherein the same plaintiff has his patent at stake.

Respectfully submitted,
GEORGE E. VANDENBURGH,
by CARLOS P. GRIFFIN, *His Counsel.*

APPENDIX A.

FILED
JAN 9 1922
ARTHUR B. MUSSMAN,
CLERK

No. 3587

UNITED STATES
CIRCUIT COURT OF APPEALS,
SIXTH CIRCUIT.

GEORGE E. VANDENBURGH, *Appellant,* vs. TRUSCON STEEL COMPANY, *Appellee.*	APPEAL from the District Court of the United States for the Northern District of Ohio.

Submitted November 14, 1921.
Decided January 4, 1922.

Before KNAPPEN, DENISON *and* DONAHUE, Circuit Judges.

KNAPPEN, Circuit Judge: Suit for infringement of claims 1 and 3 of reissued patent No. 14,182 (August 15, 1916) to Vandenburgh. The original patent,

No. 841,741, was issued January 22, 1907. The application for reissue was filed July 1, 1916. The invention relates generally to reinforced concrete construction. Its prominently-stated specific object is to "provide a reinforcing bar with one of more spirally-disposed coils secured to the bar so as to provide an extended area of contact adapted to resist strain longitudinally and laterally on the bar, and to form a truss within the body of concrete, etc." As a preferred means of securing the coils to the bar the specification discloses "a series of kerfs in one face of the bar inclined away from the center of the bar toward the opposite ends thereof," the coils being "seated within these kerfs and held therein by means of the integral spurs, which are forced downward upon the coils when inserted and permanently retain them in position." The specifications, considered in connection with the drawings, plainly show an integral spur overlapping the kerf, which when forced downward upon the coils holds them rigidly in position. Claims 1 and 3 read as follows:

"1. A concrete reinforcing consisting of a bar having a plurality of integral spurs, and a spiral coil permanently secured thereto by having the spurs bent down on the several coils, the coils extending beyond and free of the bar at the opposite side therefrom to the securing point."

"3. A reinforcing bar provided upon one edge with a series of kerfs each having an integral overlapping spur, and a coil disposed in said kerfs, each convolution thereof being retained beneath one of said spurs."

The defenses are invalidity of the reissue, lack of invention and noninfringement. The district court held claim 1 invalid as too broad, and claim 3 void for lack of patentable novelty, if construed broadly enough to embrace defendant's structure. The appeal is from a decree dismissing the bill.

The district court was plainly right in holding claim 1 invalid. As will later appear, the only novelty in plaintiff's conception is in the specific method of attaching the coils to the bar by kerfs therein and integral spurs rigidly securing the coils within the kerfs. The claims of the original patent, which were replaced by claims 1 and 2 of the reissue, in terms call for a rigid fastening. The omission of the requirement of rigidity in claims 1 and 2 was apparently intended to cover the feature of collapsibility found in later devices. Claim 1 of the reissue is thus unwarrantably broad. The same conclusion has been reached by the Circuit Courts of Appeals of both the second[1] and third[2] circuits. Claim 3 of the reissue differs from the third claim of the original patent only in the substitution in the reissue of the word "edge" for the word "end" in the original. This is plainly merely a correction of a clerical error. It thus becomes unnecessary to give further consideration to the question of the validity of the reissue.

The real date of plaintiff's invention is more or less material in determining what is prior art as related to invention. Plaintiff's original application

[1] *Vandenburgh* v. *Concrete Steel Co.*, 258 Fed., 143.
[2] *Vandenburgh* v. *Electric Welding Co.*, 263 Fed., 95.

was filed May 9, 1906. He attempted to carry the actual date of his invention back to 1903, and offered some testimony tending to show such earlier invention date. The trial judge held the testimony not sufficient to establish such earlier date. We can not disturb this conclusion. The evidence consisted solely of the oral testimony of plaintiff and another witness, taken in open court. Under well-settled rules, the burden rested heavily upon plaintiff to establish the fact of the asserted earlier date of invention to the satisfaction of the court,—whether or not such satisfaction is required to be beyond a reasonable doubt. *St. Paul Plow Works* v. *Starling,* 140 U. S., 184, 198; *Clark Co.* v. *Willimantic Co. ibid.* 481, 492; *Moline* v. *Rock Island* (C. C. A., 7), 212 Fed., 727, 732; *Barber v. Otis* (C. C. A., 2), 271 Fed., 171, 180. The question presented was one of fact only, depending upon the weight to be given this oral testimony; and the trial court's conclusion thereon must be accepted here unless the evidence decidedly preponderates against it. *Pugh* v. *Snodgrass* (C. C. A., 6), 209 Fed., 325. Assuming that we are at liberty, upon this record,* to consider this testimony, it is enough to say that the evidence does not preponderate against the conclusion of the trial judge.

Turning to claim 3: The art of steel-reinforced concrete construction generally was highly developed before Vandenburgh entered the field. It had

*The testimony is not certified as settled and approved by the trial judge, as required by General Equity Rule 75 (b). It appears to have been merely stipulated by counsel.

been applied not only to the construction of bridges, spandrel walls, dock walls, retaining walls and fireproof floor construction, but specifically to beam, girder and column construction in manufacturing and other buildings.' The art, generally speaking was already old and crowded, although the more extensive and rapid use of metal-reinforced concrete came a little later. Truss reinforcement of concrete beams was also old, through the use of radially disposed projections from the tension member (either perpendicularly or obliquely thereto), as well as otherwise. See *Trussed Concrete Steel Co.* v. *Goldberg* (C. C. A., 6), 222 Fed., 506, 509 *et seq.* The art with which we are here concerned relates to that form of column construction called "column hooping." While Vandenburgh's invention seems more specially adapted to beam and girder construction, it is declared by the specification to be applicable to column construction as well; and we shall treat the disclosure not only as so applicable but as intended to cover a plurality of vertical reinforcing or spacing members around and upon which steel reinforcement is wound in spiral form. Vandenburgh was not a pioneer in this field. Hyatt (by British patent, 1874), and Lee (also by British patent, in 1885) had disclosed iron bands looped spirally to reinforcing members, the spirals being riveted to each other or to the vertical reinforcement. Kiesserling (German

'We may refer in this connection to the following decisions of ths court: *Ferris Concrete Steel Co.* v. *Concrete Steel Co.*, 206 Fed., 666; *City of Akron* v. *Bone*, 221 Fed., 944; *Detroit Iron & Steel Co.* v. *Carey*, 236 Fed., 924; *Luten v. Whittier*, 251 Fed., 590.

patent, 1894) had disclosed columnar reinforcement by way of a series of loops attached to vertical members by square notches therein. Column hooping seems to have become active abroad about the year 1902, and in the United States about a year later; and in articles published in 1902 and 1904 column hooping was described and illustrated, the 1902 publication disclosing notches on the exterior faces of the supporting members to contain and hold the spirals. Considere (United States patent, 1904) disclosed a reinforcement consisting of longitudinal rods and "independent helicoidal coils of metal . . . surrounding the core and rods," the coils apparently not being attached to the longitudinal members; and the next year published his researches in connection with the use of "continuous helicoidal spirals." In March, 1906, the *Engineering News* published an illustrated description of metal reinforcement for columns, showing spiral reinforcement retained in place upon the vertical members between projections from the surface thereof.

It is thus apparent that Vandenburgh's invention, at the best, consisted only in the method of attaching the spiral loop to the vertical or spacing member. As already said, his method of attachment was by means of a kerf cut at an angle inclined to the edge of the vertical or spacing member, which thereby created an overhanging spur integral with the upright, the hammering down of this kerf and spur making a rigid connection between the spiral and the upright. It is true that this particular method

of attaching the loop to the upright was new as al-applied to the art of metal-reinforced concrete. But, as already shown, continuous spirals in connection with spacer bars were old in that art. It was old in metal construction generally to use that method of fastening wires to uprights, as shown by Norwood (patent, 1896) in the connection of longitudinal parallel wires with the cross-bars of sand-screens, where "diagonal slots forming acute-angle hooks" receive the wires, the hooks being "bent down to hold such wires in place." The same method had been disclosed for the fastening of fence wires to posts of cement construction, the attachment of course not being directly to the cement. We recognize that the use of diagonal kerf and overhanging spur method of connection in a non-analogous art did not anticipate the combination claim in question; but we are not considering anticipation, but invention, and the prior art in question is thus not irrelevant. *Day* v. *Mountain City Mill Co.* (C. C. A., 6), 264 Fed., 963, 964-5. The adaptation of an inclined kerf and overhanging spur connection to the reinforced concrete art amounted only to a common mechanical expedient. *Berger Mfg. Co.* v. *Trussed Steel Concrete Co.* (C. C. A., 6), 257 Fed., 741.

The defendant does not use the diagonal kerf and overhanging spur. Its coil is located in a rectangular cut in the edge of the upright, there being thus no overhanging spur, and the coil is held in position by hammering or "peening" down the metal at the edges of the rectangular cut sufficiently to hold the coil in position, not rigidly but loosely enough to permit

the collapsing of the structure for purposes of shipment. Defendant's method of fastening was also old in the metal construction art, being shown in Prescott & Bennett's 1891 sand-screen patent. The patent in suit has been considered by the Circuit Courts of Appeals of the second and third circuits. In the former (*Vandenburgh* v. *Concrete Steel Co., supra,*) claim 3 was held to disclose invention and to be infringed by a construction which seems to be substantially similar to that involved here. In the Third Circuit (*Vandenburgh* v. *Electric Welding Co., supra*) claim 3 was held limited by the prior art to a bar with kerfs in which the attached coil is placed, and a tongue or spur overlapping the kerf and holding the coil in place, and as so limited not infringed by a fastening consisting of a lip or clip struck up from the face of the spacing member.

We are not impressed that the advance in reinforced concrete construction is due in any substantial measure to Vandenburgh's contribution. Our conclusion is that, assuming for the purposes of this opinion that the claim in question involves some measure of invention, it is so narrow as to be practically limited to the specific method of fastening disclosed, and that it cannot be extended to cover defendant's method.

The decree of the district court is accordingly affirmed.

APPENDIX B.

UNITED STATES
CIRCUIT COURT OF APPEALS.

FOR THE SECOND CIRCUIT.

GEORGE E. VANDENBURGH,
Plaintiff-Appellant,
against
CONCRETE STEEL COMPANY,
Defendant-Appellant.

Before
ROGERS,
MANTON
and MAYER.
Circuit Judges.

CARLOS P. GRIFFIN and O. ELLERY EDWARDS for plaintiff.

LUCIUS E. VARNEY, THOMAS J. JOHNSTON and MANVEL WHITTEMORE for defendant.

Appeal from final decree of the District Court of the Southern District of New York in favor of plaintiff. Both parties appeal.

MAYER, *Circuit Judge*:

This is the ordinary patent infringement suit which now comes here on appeal from a final decree adjudging that plaintiff recover from defendant profits in the sum of $15,918.33 with interest from the date of the Master's report.

Originally, the District Court dismissed the bill for non-infringement but the decree was reversed for the reasons stated in 258 F. R. 143.

Thereafter, in due course, the usual interlocutory

decree was entered, *inter alia,* referring the accounting to a Special Master. The Special Master reported that plaintiff was entitled to recover profits but not damages. The District Court sustained this report. Both the District Judge and the Master wrote opinions fully and carefully discussing the questions involved.

1. The patent has been considered by several courts, *Vandenburgh* v. *Electric Welding Company,* 259 F. R. 579, 263 F. R. 95, *certiorari* denied 253 U. S. 497, *Vandenburgh* v. *Truscon Steel Company,* opinion of District Court for the Northern District of Ohio, Eastern Division dated September 23, 1920; and there have been differences of opinion.

The law of this case, however, is that set forth in this Court's opinion per Judge Ward in 258 F. R. *supra.* The gist of the case may be recalled by the following quotation:

> "These claims . . . (3 and 5 of the reissue) . . . should be construed consistently with the specifications, which are also literally the same in each patent, as meaning that the spiral coil is rigidly connected with the longitudinal bar at each point of contact. So construed the claim describes a continuous spiral rigidly and integrally connected with kerfs and spurs in the bar constituting a trusslike structure within the body of the concrete resisting lateral and longitudinal strains and which can be more cheaply manufactured than if the spiral were riveted or welded to the bar at each point of contact.
>
> The defendant's witness Cummings frankly admits that this form of reinforcing a structure was new in cement work and has come into general use. . . . The defendant's structure when

> set up to receive the concrete is exactly the same as plaintiff's except that the spiral coil is not rigidly fixed by kerfs and spurs on the bar. This enables the structure to be collapsed when not in use, a commercial improvement for purposes of shipment but which does not justify the defendant's appropriation of the plaintiff's structure."

Defendant's collapsible feature thus did not avoid infringement but merely added a commercial improvement for purposes of shipment.

It is contended by defendant that the case is one for apportionment of profits and that Court and Master erred when they ascribed (as did plaintiff) the whole value of defendant's structure as a commercial article to the Vandenburgh patent feature.

The theory of defendant is that all or, in any event, part of the commercial value of defendant's structure was due to its collapsible feature and, but for this, the structure would not have been salable. Therefore, defendant contends that when plaintiff has not adduced any testimony that the structure is salable when not collapsible or of the profits due to collapsibility, plaintiff has failed to carry the burden of proof cast upon him. *Westinghouse* v. *Wagner Mfg. Co.*, 225 U. S. 604.

Defendant did not introduce any testimony in respect of apportionment. It relied on its contention that because plaintiff failed to produce testimony upon which an apportionment could be based, he would be entitled to nominal damages only.

It may be assumed from the testimony of plaintiff's witnesses that if the structure were shipped

there would be a saving in freight. It may, also, be assumed that in some instances, owing to competitive conditions, the determining factor in a sale might be this saving. Yet, it is entirely plain that there never would have been any sale whatever without this Vandenburgh feature. It was the Vandenburgh "form of reinforcing structure" infringed by defendant, which was new in the art. The advantage according to the expert Thayer, over the method, in the prior art of riveting or wiring is that "the method of wiring used up a good deal of the section of the bar. It was that way and riveting is also expensive."

Thayer also mentioned the collapsible feature as a part of what he called the "Vandenburgh method," but, with this, we do not agree, in view of our former decision.

It is entirely clear, however, that defendant would never have sold a dollar's worth of its devices had it not availed of plaintiff's patent. The cheapness of manufacture was due to plaintiff's disclosure, which, therefore, created defendant's device as a commercial commodity. Because, then, in some instances, the additional feature of collapsibility saved freight, it cannot be said that this feature placed the burden of showing apportionment on plaintiff.

The test is whether the invention of the patent gives the whole value to the infringing device. Obviously, it must in a case where the sale of the article would be impossible without availing of the disclosure of the patent and, where the additional feature had no relation to the structure, *cua* structure, or to

its shipment as such but only to reduced expense in transportation, accomplished by means which in no manner changed the character of the structure when used for the purposes for which it was designed.

If, therefore, the saving of freight was an accounting element, the burden of so showing was on defendant.

Westinghouse v. *Wagner Mfg. Co., supra.*

This is peculiarly illustrated in this case.

Barbour, who was in charge of the details of the sales in defendant's New York office, was called by plaintiff. He testified as follows:

> "Q. 41. In any event, these spirals are shipped collapsed, connected to some longitudinal bars, you understand that to be the subject matter of this suit? A. I understand that to be the subject matter of this suit, but the spirals are not all shipped in that way, not in my territory.
>
> Q. 42. What percentage are shipped in any other way? A. You mean the territory I know about, that is within New York City or a radius of 25 miles of New York City?
>
> Q. 43. Where are you selling? A. In New York City or a radius of 25 miles from New York, they ship what we call field assembled; that is, the coil wire is shipped, it is coiled to diameter and shipped separate as a coil, then the angles are punched and shipped separate, that is on account of a restriction.
>
> Q. 44. Assembled by you or assembled by the contractor? A. By the contractor on the job, what we call field assembly; that is on account of a restriction, I think it is, Metal Lathers Union; they won't allow us—they won't allow I don't know as I should say 'us,' but they won't allow

the contractors to use spiral in any other way in New York City or within a radius of 25 miles of New York."

The foregoing shows that a considerable business was done by defendant without the collapsible feature because of the "Union" restriction and, thus, destroys any contention that collapsibility was, in all instances, an indispensable requisite.

From what has been said, *supra,* there was no obligation upon plaintiff to apportion the profits between the Vandenburgh features and the prior art. There was no standard of comparison and, on the evidence in this case, there was no occasion for that reason to apportion profits. See *Philadelphia Rubber Works Co.* v. *U. S. Rubber Reclaiming Works,* F. R. , recently decided by this court.

2. On the facts in the case as clearly set forth by the Master and approved by Judge Knox, there was no evidence which afforded any basis for fixing the amount of a reasonable royalty. We think this question was wholly one of fact to be disposed of on settled principles which do not call for exposition.

3. Plaintiff urges that he is entitled to recover interest as six per cent as to each item of profit from the date thereof as set forth in defendant's account. There is no evidence of wanton infringement. The mere fact that the courts held different views as to the claims of the patent is sufficient to negative any such suggestion.

The Philadelphia Rubber Works Co. v. *U. S. Rubber Reclaiming Works, et al.*

Metallic Rubber Tire Company v. *Hartford Rubber Works Company,* *F. R.* .

In an infringement case, where there is a genuine controversy, it is settled in this circuit, that interest runs from the filing date of the Master's report.

Oehring against *Fox Typewriter Co.*, 251 F. R. 584.

Metallic Rubber Tire Co. v. *Hartford Rubber Works Company, supra.*

The Philadelphia Rubber Works Co. v. *U. S. Rubber Reclaiming Works, et al., supra.*

4. Plaintiff, contrary to defendant's contention, was not guilty of laches and there were no intervening rights. Plaintiff has recovered profits only from August 15, 1916, the date of the reissue patent.

The decree is affirmed without costs on this appeal.

In view of the results there is no occasion to deal further with the Master's motion to dismiss or affirm as to his allowance.

IN THE

Supreme Court of the United States

GEORGE E. VANDENBURGH,
Petitioner-Appellant

vs.

TRUSCON STEEL COMPANY,
Respondent-Appellee

No. 273
October Term
1922

Motion to Advance for Hearing, or to Consolidate for Hearing, with Concrete Steel Company, Petitioner-Appellant vs. George E. Vandenburgh, Respondent-Appellee, Number 238, October Term, 1922.

Truscon Steel Company moves the Court to advance this case for hearing immediately following hearing of above companion case number 238, or to consolidate this case for hearing therewith, for reasons in memorandum following:

TRUSCON STEEL COMPANY,
by W. F. Guthrie, Solicitor and of Counsel
c-o Truscon Steel Co., Youngstown, Ohio

CONSENT TO MOTION

Counsel for moving party has sent manuscript copies of foregoing motion and grounds to counsel for other parties.

Mr. J. T. Johnson, of Counsel for Concrete Steel Co., writes under date of October 17, 1922, advising as to practice in presenting motion, and saying:

"Of course, I will not oppose a motion to advance, but, on the contrary, authorize you to say that we concur in the motion to advance, though we prefer that the cases shall not be consolidated; but I will not resist the direction of the Court, if it shall conclude to consolidate them, as I think the time will be sufficient."

Mr. Carlos P. Griffin, Counsel for Vandenburgh, writes under date of October 18, 1922, enclosing copy of manuscript motion to advance, the body of which is as follows:

"Now comes CARLOS P. GRIFFIN and W. F. GUTHRIE, counsel for the parties herein, and moves this Honorable Court that the Hearing of the above entitled case and the case of George E. Vandenburgh vs. Concrete Steel Company, No. 238, on the Docket for the October Term, 1922, be held the same day, said cases being upon the same patent involving substantially similar infringements and patented art."

and requesting Counsel for Truscon Steel Co. to join in motion "and forward to my Associate, Mr. E. C. Brown, 734 8th St., N. W., Washington, D. C., who will present it to the Supreme Court."

The undersigned has complied with the request.

W. F. GUTHRIE,
Counsel for Truscon Steel Co.

MEMORANDUM IN SUPPORT OF MOTION

Both above cases are before this Court upon petition for certiorari, granted on account of diversity of decisions in different circuits.

The Court of Appeals of the Second Circuit held the patent sued on in each case valid and infringed, and the Court of Appeals of the Sixth Circuit held it invalid.

The Government of the United States (we are informed) joined in the petition for certiorari in number 238 because of the pendency of a suit for $500,000 against the United States for infringement of the same patent now pending and undisposed of.

Petition for certiorari in case number 273 was not granted upon the application of but against Truscon Steel Company.

The questions arising upon the record in each case are identical except:

(a) The alleged infringing structures are different; but the difference is very slight, being only in the form and location of the cuts or notches in a longitudinal bar, in which are held, for proper spacing, the convolutions of a helical coil, retained in the notches by hammering down the edges of the notches. This difference could be fully noted by the Court upon a moment's inspection of the respective exhibits;

(b) The defendant below in case number 273 offered in evidence, in addition to the prior art patents offered in number 238, additional prior art patents believed to be pertinent to the defense of non-invention (which was not discussed at all in the opinion in the Second Circuit) and offered an expert witness to disclose the technical factors of stress, etc. involved in the practice of the art to which the patent would be applied, but no expert testimony attempting to construe

or explain patents or otherwise express an opinion upon the proper construction or validity thereof. Plaintiff sought to rebutt this testimony.

It is believed that this Court should have opportunity to consider all questions that respective counsel may believe to be presented by these substantially identical records at one time, and thereby not only have the benefit of possibly different theories of presentation but avoid possibility of being subsequently asked in case 273 to consider new questions upon the same record, or to reconsider questions already presented upon any claim that matters affecting same were not fully presented in the first hearing.

Respondent-Appellee is willing to accept such reasonable abbreviation of the usual time for oral argument as the Court may deem proper under the circumstances.

W. F. GUTHRIE,
Counsel for Truscon Steel Co.,
c-o Truscon Steel Co., Youngstown, Ohio.

IN THE

Supreme Court of the United States

No. 764, October Term, 1921.

NOW

No. 273, October Term, 1922.

George E. Vandenburgh,
Petitioner-Complainant,

vs.

Truscon Steel Company, a Corporation,
Respondent-Defendant.

BRIEF OF RESPONDENT-DEFENDANT.

W. F. Guthrie,
Of Counsel for Defendant,
Youngston, Ohio.

Press of Byron S. Adams, Washington, D. C.

IN THE

Supreme Court of the United States

No. 764, October Term, 1921,

NOW

No. 273, October Term, 1922.

George E. Vandenburgh,
Petitioner-Complainant,

vs.

Truscon Steel Company, a Corporation,
Respondent-Defendant.

BRIEF OF RESPONDENT-DEFENDANT.

EXPLANATORY.

Although the imprint upon the back of the brief for petitioner-complainant shows that it was prepared for service during "October, 1922" (attorney for petitioner assuming that service, instead of filing, was required), nevertheless, the brief itself was filed in this Court and first came to the attention of respondent-defendant today, January 15, 1923. This was rather in line with proceedings in the court below, where the record was held back for months, the case disposed of at its setting by waiver of time by the respondent below, with reply brief filed just as the case was called for hearing.

This situation prevents submission without delay except by respondent-defendant using its brief as appellee in the Court of Appeals of the Sixth Circuit. The paging of the record in this court corresponds with the paging of the record in the Court of Appeals, so that references in the brief below to record paging are still available without change.

We will immediately follow by the insertion of the brief below and follow the conclusion of that brief with such few additions as the brief of petitioner in this court suggests as possibly, but only possibly, necessary.

United States Circuit Court of Appeals

SIXTH CIRCUIT.

GEORGE E. VANDENBERG,
Appellant,

vs.

TRUSCON STEEL COMPANY, a Corporation,
Appellee.

Eq. No. 500.

APPELLEE'S BRIEF.

W. F. GUTHRIE,
Youngstown, Ohio,
E. N. PAGELSON,
Detroit, Mich.,
Attorneys for Appellee.

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United States Circuit Court of Appeals

SIXTH CIRCUIT.

GEORGE E. VANDENBERG,
Appellant,

vs.

TRUSCON STEEL COMPANY, a Corporation,
Appellee.

Eq. No. 500.

APPELLEE'S BRIEF.

(Numerical references generally are to paging of the printed transcript. Preceded by "Br.," they are to appellant's brief.)

IN LIMINE.

Appellant's brief nowhere complies with the rule requirement of reference to the record. Except that patents referred to in appellant's brief by name and number may be located through the index to the record, all other statements of fact in the brief are *ipse dixit* of counsel. Largely the brief incorrectly states specific facts in the record, draws unwarranted conclusions of fact from the record or asserts matters claimed by counsel in no wise referred to in the record. Neither court nor opposing counsel should be called upon to waive the rule concerning reference and wander through the record in search of confirmation or disproof of appellant's assertions. Nor should opposing counsel be required to

unduly extend this brief by quoting *in extenso* from appellant's brief the erroneous statements therein in order to refute them by record references.

Appellant's brief should be stricken from the record and the judgment affirmed.

Should the Court, of grace, undertake the consideration of the appeal on the record as a whole, answer brief may be necessary.

The opinion in the court below considers the issues more comprehensively than in any of the four other opinions written upon the invitation of other briefs upon other records, and it is a correct analysis as far as it goes. We think it goes far enough.

However, claim No. 3 of the reissue patent, one of the three claims in controversy here, was upheld by the Court of Appeals in the Second Circuit (in an opinion indicating, in the matters determined, that counsel there contesting the patent were satisfied to attack it only upon the limited grounds considered by the court), and, in the Third Circuit, the patent was assumed to be valid for the purposes of that case because its validity was immaterial in view of the opinion of the court that there was no infringement. If we were disposed, as is appellant's counsel, to make assertions based upon recollection and personal observation, we might state, therefrom, that Judge Buffington, after extending the time and listening for nearly six hours in an apparently vain effort to comprehend the contentions of counsel, having learned, at least, that the patent in suit was a mere paper patent which had "made no impress on the art" (263 F. 97) and that the new claims of the reissue "were only added 9 years after his patent was granted, to make infringers of those who had used other forms of attachment than the kerf and over-lapping spur" (263 F. 97), began looking through the exhibits to discover whether there was not

in the lack of infringement, a short cut to disposition, and, after studying defendant's structure, directed counsel to address themselves thereafter to the question of infringement. So there has never been full consideration of the merits of the patent in suit.

The appellee in this case has transacted a large business in its structure—"column hooping." It cannot afford to take any risk whatever by failing to elaborate to this Court, more fully than in the opinion below, defences to the patent there disclosed, or by failing to call attention to other defences which the trial court did not pass upon in view of its judgment as to the sufficiency of what was discussed. Accordingly, we beg the indulgence of the Court in presenting the following argument.

For the sake of as much brevity as possible in a comprehensive presentation of the defences, we shall endeavor to present them consecutively and as succinctly as possible, attaching referred-to *appendices,* to which the Court may turn for a more elaborate consideration of any proposition not deemed sufficiently disposed of in the primary presentation.

STATEMENT.

Opinions covering various phases of fact and law pertaining to this patent have been written by five judges.

District Judge Orr, at Pittsburgh, filed an opinion at the May Term, 1917 (259 F. 579), in the *Electric Welding Company* case, finding, as a fact, from certain features of appellant's description, hereinafter more particularly discussed, that appellant had a purposeful intention that the coils of his device should be "rigidly" secured in the bar thereof against movement at the point of attachment, and, therefore, that it did not have the

commercial feature of defendant's structure of being collapsible for convenience in transportation (which, it appears from the opinion, was contended by defendant's counsel in the trial before Judge Orr, to be an essential of appellant's alleged invention), so that the reissue claims alleged to cover a *collapsible* structure could not be asserted against the intervening rights of others. Judge Orr, however, held it unnecessary to decide the case on this ground, being satisfied that there was *no invention* in the adaptation of the old kerf and tongue method of affixation to the old spaced continous coil, even if there was no direct and complete anticipation. For this reason he did not decide the questions of direct anticipation and infringement, merely saying that if the patent could be sustained at all, it must be sustained in so limited a scope that there was no infringement.

While the appeal from Judge Orr's decision was pending, an opinion was filed in the District Court, New York, by Circuit Judge Hough on May 13, 1918, in the *Concrete Steel Company* case. Judge Hough's opinion does not appear to have been printed in the reports. We copy it as Appendix "A" to this brief (*infra*, p. 36). Judge Hough found that the appellant's device was not for the structure known as column hooping at all, but for a "reinforcing bar, not attached to a *continuous* spiral, but to spirals *inclined in opposite directions from the center,*" and that Fig. 4 of the patent, relied upon by appellant as showing the continuous spiral, was a mere detail of one end of the reinforcing bar (a proposition more elaborated hereinafter in this brief); that the original contemplation of appellant was for a purposely "rigid" attachment of his spur to his bar, broadened in the reissue "to catch manufacturers like the defendant," but not considering the intervening rights of manufacturers of collapsible column hooping, which, the opinion re-

cites, was asserted to be the claimed invention of appellant "because it is thought clear that *rigidly* is *exactly* what the patentee meant." Thereupon Judge Hough decided that the reissue was unlawful as to the claims alleged to read upon a *collapsible* structure, and not infringed by the claims repeated from the original patent, construed, as they must be, by reference to the supporting disclosure. He held, as stated by Judge Westenhaver, "that the only invention revealed by the specification is the *exact* construction described and pictured in Figs. 1 and 6" of appellant's patent. He does *indirectly* hold that there was no invention as pertaining to such a device as was used by the several defendants. But that is a special question pertaining to what appellant actually thought he was inventing, which we prefer to discuss separately.

The next opinion was filed by Judge Ward in the Court of Appeals for the Second Circuit, April 16, 1919 (258 F. 143). Why, the appeals being prosecuted by the same appellant, the decision of Judge Hough made May 13, 1918, reached final disposition April 19, 1919, while the decision of Judge Orr at the May Term, 1917, did not reach opinion in the Third Circuit until February 19, 1920, is not disclosed in the record. This feature will be commented upon as a matter of surmise later.

It is to be presumed that the Court of Appeals in the Second Circuit gave attention to all questions urged by counsel for its consideration. The opinion makes no reference to the prior art. Apparently the court was not asked to consider the prior art. The opinion indicates that the contentions presented were that claims 1 and 2 of the reissue were invalid for unjustifiable broadening upon reissue, and that the defendant's structure did not infringe because the plaintiff's structure was rigid and the defendant's structure collapsible. The Second District

Court's opinion shows how largely the controversy up to that time had raged around the questions of whether plaintiff's structure was collapsible, the holdings to that time being that because plaintiff's structure was not collapsible and the respective defendants' structures were, the latter did not infringe.

The Court of Appeals for the Second Circuit concurred in the two previous opinions that claims 1 and 2 of the reissue were invalid. It also concurred in the finding that plaintiff's disclosure of structure contemplated "rigid" connection between the coils and the bar. But the Court held that to merely loosen the connection so that the structure would be collapsible, while "a commercial improvement for the purposes of shipment" was only an improvement involving the substantial appropriation of the idea patented to the plaintiff, and therefore infringed certain claims of the plaintiff which had *not been changed* on reissue.

The court does not discuss the questions subsequently raised before Judge Westenhaver and discussed in his opinion, as far as he found it necessary to decide them, nor still further contentions made in this brief.

Having thus procured a decision upholding unchanged claims 3 and 5 of his reissue in a case where opposing counsel was apparently satisfied to limit the range of controversy, (and this, we surmise, is the reason appellant pushed his case in the Second Circuit while holding back the appeal in the more fully presented case in the Third) plaintiff completed his appeal in the Third Circuit, where a decision was rendered on February 19, 1920 (263 F. 95). The decision was based on non-infringement, and we presume the denial of rehearing was a refusal to reconsider this proposition. The court did not consider the question of invention for the reason that even though, as the court found as to the particular

special "kerfed combination," it was novel, nevertheless it was such a "narrow contribution to the art" upon which it had "made no impress," that it was entitled only to most specific application at the best and, so considered, was not infringed. Accordingly, the court felt justified in avoiding the consideration of invention and "*assuming* for *present* purposes, as we will, that it embodied invention." We feel justified in thinking that if the court had regarded appellant's "assumed" invention as a meritorious contribution to the art, it would have been less ready to hold so substantial an equivalent of appellant's method of attachment to be non-infringing. As Judge Westenhaver says, if the Court of Appeals of the Third Circuit were to be followed, appellee's construction could also be equally well held non-infringing. Judge Westenhaver preferred to dispose of the case upon broader grounds presented for his consideration.

It is to be noted that in the Court of Appeals for the Third Circuit, as in the instant case, appellant was relying only upon unchanged claim 3 of the reissue, despite the support of his unchanged claim 5 in the Second Circuit.

The Court of Appeals of the Third Circuit concurred in holding broadened claims 1 and 2 of the reissue "unrestricted by the limitation on kerf and spur, * * * only added 9 years after his patent was granted" invalid (263 F. 97, "2").

Then, for the first time, in the court below, was the distinction between "rigidity" and "collapsibility" as negativing infringement not advanced as the *principal* ground of defence, and other attacks from various angles made directly upon the patent itself. Judge Westenhaver sustained a number of these attacks. Others will be included in this brief.

HISTORY OF THE PATENT IN SUIT.

Appellant claims to have conceived his alleged invention and reduced it to practice in 1903. He attempts to prove this by himself and his witness Blethyn. The evidence is found on pages 93, 96, 97 and 100-110 of the record. As predating evidence is required to be clear, certain and specific as to facts, as well as convincing in volume; as the very controversy here is as to just what the invention really was; and, as this testimony does not apply to columns at all, and gives us no idea of what appellant claims to have done in respect even to beams, except that he had a notched bar with wires through the notches, we feel that the conclusion of the court below that the invention cannot be dated back of the application date for any purpose needs no further discussion.

The gauzy theories of appellant developed into his specific application on May 9, 1906, and the patent was granted January 22, 1907 (213) after appellant, in the Patent Office, had made certain concessions to the Examiner's references by assertions as to what he was inventing, which will be hereinafter referred to.

Reinforced concrete construction, other than the mere binding with steel of massed concrete in foundations, commenced with the steel reinforcement of concrete beams or girders, in which steel rods were laid at the bottom of the beam to resist extensions under loads, the concrete above serving to resist the corresponding compression in the upper part. It was soon learned that the steel tension rods at the bottom would be more effective if connected with smaller members running therefrom either at right angles or in diagonals each way from the center. These stirrups or diagonals can be seen in almost any reinforced concrete beam construction of the present day. A special type of such a "reinforcing *bar*," with diagonals, was invented by Kahn, the

president of appellee company in 1902 (248) and was the foundation of the business of appellee company. Other patents on methods of using these diagonals in connection with the *main* reinforcing bar (more particularly referred to *infra*) shortly followed.

Columns were needed to support the beams; but, in the early art in this country, these columns were created by the use of a beam stood on end, with reinforcing *bars* on OPPOSING *sides* of such columnar beam, as described in the Kahn patent (lines 12 to 19, p. 253 of record), and in Fig. 6 of the patent in suit.

There had been suggestions of the use of *continuous spiral coils* around columns, and even in beams, prior to the literature of Considere, a French engineer; but Considere was the first to elaborate the *stresses* of concrete in columns, as distinguished from beams, and to impress on the art the value of *encircling* steel to resist the tendency of the column under pressure from above to *break out laterally* or spawl (411). This encircling binding of the columns became active abroad about 1902 and they began to adopt it in this country following the publication of Considere's book in 1903. Like all ideas, its use developed progressively with experience and extended knowledge, and patents on various devices of continuous encircling spirals or independent encircling bands continued to come out of the Office long before appellant's application (273, 279, 283, 287, 290, 293, 296, 300, 304, and 306).

Largely, these patents contemplated a structure which could be fabricated in the factory, but which would be collapsible in shipment to the job, a commercial requirement, as otherwise the structures would be cumbersome in transit.

The general development of this special structure for columns in the practical art, as distinguished from

the Patent Office, is recited in the record (58, 60, 81 and 82).

The practical construction of this type of columnar reinforcement, the accepted trade name of which is "column hooping," involved the use of spacer bars, to hold the encircling reinforcement in place until after the concrete was poured, and, in practical necessity, involved the use of at least two spacer bars, opposite each other, and often more than two of such spacers.

This type of construction having gone into general use, the appellant, (whose original conception pertained only to a beam construction with *looped* instead of straight oppositely extending diagonals on the main "bar" for beam reinforcement) in 19*16*, conceived the idea that a *detail* of a "modified form" of his reinforcing *bar*, shown in Fig. 4 of his patent of 19*06*, disclosed the idea of a *continuous* spiral; that while Fig. 4 showed only *one* bar, it justified the conception of using a *plurality* of spacer bars on such continuous spiral; and that if he could get rid of the rigid, non-collapsible element of his specification and claims, and date new claims in reissue back, he could monopolize the column hooping art as so interveningly developed. He accordingly filed his application for reissue on July 1, 1916, and the patent was reissued six weeks later.

During the intervening more than nine years, no one had been induced to use appellant's construction. It was impracticable (even in an up-ended beam) in that the loops interfered with the proper pouring of the concrete (63, 159). After his reissue, a Chicago concern, which had built a building in San Francisco, took out a license as cheaper than defending an infringement suit in California, but is not shown to have thereafter built anything. After the appellant's patent was sustained by the Court of Appeals of the Second Circuit, a Buffalo concern took

out a license (35). As noted, *supra*, all the courts have joined in finding that appellant "made no impress on the art."

QUESTIONS INVOLVED.

(1) The patent in suit is a mere paper patent, entitled to consideration no less and no more than patents of that character.

(2) Appellant did not invent "column hooping" at all, and had no idea that he had made such invention until after column hooping came into general use. Practical men, expert witnesses on both sides below and the Patent Office saw nothing suggesting column hooping in appellant's patent.

(3) The patent contained no sufficient disclosure of information concerning "column hooping" to justify claims reading thereon.

(4) If appellant actually had a conception of column hooping, there was no invention, in view of the prior art.

(5) The application for a reissue constituted a concession by appellant that his *original* patent did not cover the invention now claimed; and a broadening of the claims was invalid, even though otherwise justified, in view of the intervening rights of defendant and others.

(6) The reissue was invalid because there existed no jurisdictional facts justifying the reissue. The original patent was surrendered upon reissue. Accordingly, appellant has no patent at all.

(7) Under any construction of the patent and claims which would support their validity, there is no infringement.

DECISIONS IN OTHER CIRCUITS.

Before coming to the merits, we have the following preliminary question:

It is reiterated in appellant's brief that this patent has been upheld in the Second and Third Circuits, and therefore should be upheld in this.

Also, extended argument is made by appellant against decisions elsewhere that claims 1 and 2 of the reissue are invalid. Sauce for the goose should be sauce for the gander. All five previous opinions have concurred in holding directly and squarely that claims 1 and 2 of the reissue are invalid.

On the other hand, the Court of Appeals of the Second Circuit decided only the questions that were presented to it, as disclosed in its opinion. It did not have before it the evidence presented in the court below. So far as it may, if it did, have part of that evidence before it, the questions raised by that evidence were not presented to the court except to support the contention that appellant's structure was not collapsible and the structure of defendant in the *Concrete Steel Company* case was collapsible, which the court held was only an improvement, including the substantial elements of the otherwise uncontested patent, and therefore infringed the patent as so otherwise not contested. (or assume for purpose of decision

The Court of Appeals of the Third Circuit did find that the "combination," as far as all of the elements of of the combination were concerned, was new and useful. We do not contend that the prior art *explicitly* and *affirmatively* disclosed the identical kerf and spur element in combination with a continuous spiral and a spacer bar, (although appellant's expert says it would be *inferred* as an incident of certain drawings referred to *infra*). Our more conclusive contention, in that particular respect, is that there was no invention in using that form of

affixation as a *preferred* element in a combination otherwise shown, and that the method of attachment was a mere matter of personal choice of one familiar with the metal working art involved. The Court of Appeals of the Third Circuit did not have this question directly befort it, in view of its conclusion that there was no infringement anyway, so that, accordingly, it only "assumed" invention in this respect "for present purposes."

The other questions presented by the instant record have not before been *directly* considered, although opinions on the patent in suit as hereinafter pointed out, support, by strong inference at least, the contentions made *infra*.

Even when there has been a decision in another circuit *directly* in point, upon the same proposition, while it is strongly persuasive, it is not controlling against a contrary judgment on the part of the second tribunal. It should be followed only when the second tribunal is "in doubt" as to what its decision should be.

Mast, Foos & Co. vs. Stover Mfg. Co., 177 U. S. 485;

Searles vs. Worden et al., 11 Fed. 501;

Torrey et al. vs. Hancock, 184 Fed. 61;

National Cash Register Co. et al. vs. American Cash Register Co., 53 Fed. 367;

Curtis vs. Overman Wheel Co., 58 Fed. 784;

Beach vs. Hobbs, 92 Fed. 146;

Hatch Storage Battery Co. vs. Electric Storage Battery Co., 100 Fed., 975;

Doelger vs. German-American Filter Co. of N. Y., 204 Fed. 274.

THE PATENT IN SUIT IS A MERE PAPER PATENT, ENTITLED TO CONSIDERATION NO LESS AND NO MORE THAN PATENTS OF THAT CHARACTER.

On this proposition we deem it unnecessary to go further than refer to the remarks of Judge Buffington (263 F. top of page 97); of Judge Hough (*infra*, p. 37) and the Court below (475). The original patent "made no impress on the art." "There is no proof at all that plaintiff has contributed to that growth." "He has contributed nothing to the progress of reinforced concrete construction." The reissue patent was obtained "to make infringers of those" who had built up the practical art. "The evidence makes it plain that this change was made to catch manufacturers like defendant."

The consideration to be given such a paper patent is too well known to call for citation of authorities.

In another connection (*infra*, p. 48, *et seq.*) it will be pointed out that the Patent Office, as well as practical practitioners of the art and experts in the court below failed to find in appellant's patent even a *suggestion*, much less a *disclosure*, of the "column hooping" in practical use.

APPELLANT DID NOT INVENT "COLUMN HOOPING" AT ALL AND HAD NO IDEA THAT HE HAD MADE SUCH INVENTION UNTIL AFTER COLUMN HOOPING CAME INTO GENERAL USE. PRACTICAL MEN IN THE ART, EXPERTS ON BOTH SIDES BELOW AND THE PATENT OFFICE SAW NOTHING IN APPELLANT'S PATENT SUGGESTING COLUMN HOOPING.

The term of the patent in suit, "reinforcing bar" is well-known and used to describe a rod or bar used to reinforce a concrete beam against the lower stress of tension resisted by the compression of the concrete in the upper part of the beam. Such *main* reinforcing *bar* may have *minor auxiliary* members attached running into the beam vertically or in diagonal directions opposite from the center to transmit the stress of the concrete to the bar, develop truss action by a combination of the steel and concrete, and resist certain diagonal shear which develops toward the respective ends of concrete beams. The tensional stress resisted by the bar is *longitudinal* of the bar itself. Column hooping consists of independent spaced circular bands or a continuous spiral so closely spaced as to serve as an encirclement practically at right angles to the length of the column, used for the purpose of resisting the *lateral expansion* of the concrete under the superimposed load. The stress resisted by the encirclement of column hooping is *not longitudinally* of the band or rod of which it is composed, but *directly against* it.

Any structure of wood, iron, concrete or otherwise, having any effectiveness as a beam will have some effectiveness as a column if stood on end. But the stresses to be met are different. Before the necessity of reinforce-

ment against the lateral expansion of concrete under pressure in columns was recognized, concrete columns were reinforced by longitudinal rods; but, in such case, whether the rods were plain rods, or had minor auxiliary members running into the concrete, similar reinforcement was placed on each side of the column or at each corner of the column.

At the time of his application and of the issuance of his patent, and until the art of column hooping had obtained wide spread recognition within the nine years following, and appellant sought a reissue in the hope of monopolizing this other art, appellant had no conception of the use of *continuous* spiral encirclement *around* columns to resist expansion from within outward. Appellant's only original conception was of a *main* longitudinal *reinforcing bar* for use in beam construction with auxiliary *looped diagonals* running up *into* the concrete, not in a spiral continuous from one end of the structure to the other, but in spirals running in opposite directions from the center of the structure. Appellant's only conception of the use of his device in columns was by placing his reinforcing bars on opposite sides of the column as shown in his Fig. 6.

Appellant's attempt to monopolize the column hooping art upon the theory that he had invented the use of a spiral continuous from end to end, the coils of his spirals being seated in kerfs of a longitudinal bar beneath overlapping spurs, is based upon Fig. 4 of his patent. But Fig. 4 of the patent is not intended to represent a *complete* reinforcing unit, but is only a *detail* of *one-half* of a modified form of appellant's looped diagonaled reinforcing tension bar for beams. It is only intended to show how *one end,* or one-half, of a *complete* structure might be constructed by the use of a *single* coil instead of the *preferred double* coils or loops elsewhere shown in each of the other drawings.

The foregoing conclusions as to the nature of appellant's invention are confirmed by the prior art in reinforcement for beams upon which appellant sought to improve; by the explanations of the patent itself as to the purposes appellant deemed essential to his structure and accomplished by it; by the explanations of the patent itself as to what part of the drawings represented the main structure and what represented details; by the fact that a coil continuous in a single direction throughout the structure could not accomplish the alleged purposes of the patent; by the testimony of appellee's witness, Professor Turneaure, Dean of the Engineering School of the University of Wisconsin, an author of high and long recognized standing, whose qualifications were admitted by appellant's counsel; by the admissions upon cross-examination of appellant's expert Thayer, agreeing in practically every detail with Professor Turneaure; by the fact that no practical man in the art had ever recognized appellant's patent as applying to column hooping construction or sought or accepted a license, or, even as to beams, been willing to use appellant's structure; by the fact that the Patent Examiner, who allowed appellant's patent, and who had previously allowed applications on column hooping construction, confined his references against the application to features of prior beam reinforcing patents, making no reference to the prior column hooping patents; and by the fact that the same Examiner, in allowing several succeeding column hooping patents, in no single case cited appellant's patent, which he had allowed, as a reference against the latter applications, although it is conceded by appellant's witness Thayer that if appellant's structure covered column hooping, the subsequent patents should not have been issued in view thereof.

It seems strange, in view of the foregoing, but nevertheless is a fact, that in none of the prior litigation over this patent was the question directly raised as to whether appellant had in mind the invention of anything but an improved type of the oppositely extending diagonals of the longitudinal tensional reinforcement of the prior art. Circuit Judge Hough, however, considered this phase of the patent incidentally upon the question of rigidity or collapsibility, finding that although Fig. 4, taken alone as a complete structure, might have been collapsible, appellant did not intend to use a collapsible structure because Fig. 4 only disclosed a modified form of using the coil in the same manner as in Fig. 1 "so as to be rigid, truss-like and non-collapsible." Judge Orr also partly reached the conclusion of non-collapsibility through a similar line of reasoning. The question was directly submitted to Judge Westenhaver, but he passed it as immaterial in view of his findings against the patent upon other grounds.

A detailed analysis of the patent and a presentation of the testimony supporting our statements above as to the real nature of appellant's invention and the views of men in the practical art, of expert witnesses and of the Patent Office, would unduly lengthen this title of the brief. This Court, also, may dispose of the case upon other grounds. The Court can satisfy itself of the propriety of our contention under this title by turning to the elaboration of the contention *with complete reference and quotation* as found in Appendix "B," (*infra*, p. 41).

THE PATENT CONTAINED NO SUFFICIENT DISCLOSURE OF INFORMATION CONCERNING COLUMN HOOPING.

Disclosure co-extensive with the claims is the consideration of temporary patent monopoly. Whatever the appellant's own idea was, he can claim no more than he has told the public how to freely use after the patent expires. It is of the essence of such consideration that the information be given so as to be reasonably comprehensible by the average man of average skill. Otherwise, the consideration fails. *Patents are not to be sustained through strained efforts to interpretively piece out of the specifications something which might sustain the claims.*

As is pointed out under the preceding title of this brief, the Examiner who considered appellant's original application, made reference only on the theory that it was for beam construction. No references were made to the prior art of encircling enclosures of columnar concrete to resist expansion of the column under superimposed pressure.

In considering column hooping applications subsequent to Vandenburgh, the Examiner could see in appellant's patent nothing to be cited in the consideration of the column hooping art.

Appellee's expert, Turneaure, could see nothing in the patent suggesting column hooping. Appellant's expert, Thayer, under persistant cross-examination could point out *specifically* nothing suggesting column hooping.

Appellant has never been able at any time to induce anybody to use his structure for any purpose. It has never been erected anywhere. Practical men in the art proceeded with its development commercially, and inventors of improved details proceeded with their applications, and nobody thought of applying to appellant for a license.

While column hooping was in use in thousands of buildings throughout the country, appellant never even threatened infringement suits under his original patent. He apparently had no idea that his original patent either covered or contemplated anything of the kind. It was only after somebody, somewhere, conversant with the wide use of column hooping, having conceived the idea that, by use of appellant's detail Fig. 4, in connection with additional claims in *reissue*, this developed art could be monopolized, that there was thought of putting appellant forward as the basic genius in the column hooping art. Even the inspirer of this scheme did not consider that any claims in the original patent covered column hooping. The reissue was supposed to be necessary to get claims that did. It was only when the claims added upon reissue were held invalid that reliance upon original claims, first 3 and 5 of the reissue, now only 3 of the reissue, was asserted. Even now, appellant's brief, from pages 34 to 45 inclusive, is devoted to an effort to show that all of the judges who have decided the new claims upon reissue to be invalid were wrong. This is a quite patent recognition that the claim of the original patent, now claim 3 of the reissue, will not support appellant's case.

In view of all of the foregoing evidence that appellant's original patent did not disclose the special structure of column hooping, adapted functionally to meet the special needs of columnar construction, with sufficient clarity for ordinary apprehension, how can it be said that appellant gave the public the benefit of a disclosure which would support his present claims?

IF APPELLANT ACTUALLY HAD A CONCEPTION OF COLUMN HOOPING, THERE WAS NO INVENTION, IN VIEW OF THE PRIOR ART.

Lack of invention may be established either:

(1) By showing a direct and complete anticipation, disclosing all of the elements of the claims of the patent in suit. This is often a difficult matter in case of combination patents including many elements; or

(2) By showing that all the elements in the combination were old, even though the particular combination in itself was new; that the functional purpose achieved by the combination was old; and that it was a mere matter of choice and preference with an artisan, familiar with the same or analogous arts, to select for the combination the element which in his judgment, considering the problems of economy in materials, fabrication, or special use, were best suited to the particular case of employment of the combination contemplated.

We confidently assert that the record discloses a direct and complete anticipation.

In using, immediately above, the term "direct anticipation," we use it, not in the sense of a "kerf *and* over-lapping spur" but in the sense of the structure of appellee shown in Exhibit No. 2 (211) and more in detail in respect to the method of attaching the spacers to the coils in a larger photograph (217) where defendant does not have a "kerf and spur," but has rectangular notches in the leg of a "T" spacer, the coil being inserted in the notches, and the edges of the notches being afterwards "peened" down on *each* side of the notch so as to loosely hold the coil in the notch. If this structure of appellee is within the terms of appellant's claim, then the disclosures in the earlier art of the same construction "directly" anticipate the "kerf and over-lapping spur."

In the patent to Kieserling & Moller (395), disregarding the bulged-out base, which appellant's witness Thayer notes as the only distinction between the disclosure of this patent and the disclosure of appellant's patent, we have, quoting claim 3 of the patent in suit, the only one in issue not repeatedly declared invalid; "a reinforcing bar (if a longitudinal spacer is a reinforcing bar) provided upon one edge with a series of kerfs (see Kieserling's Figs. 5 and 7a, adjoining 5 on the right) each having an integral over-lapping spur (if rectangular notches peened down constitute over-lapping spurs), and a coil disposed in said kerfs, each convolution thereof being retained beneath one of said spurs" (if retention under the peened edges of the rectangular notches constitutes such retention).

Kieserling's rectangular notches are shown in Fig. 7c at the upper right corner of page 395 of the record, in which "is shown *advantageous* embodiment in which the wire 'h' is connected with the studs so as to be capable of resistance in *both* directions, which is not the case in the embodiment illustrated in Figs. 5 and 7c." It is true that Kieserling does not, in his drawing, disclose the rectangular notches of his Fig. 7c peened down, or state specifically in his description that they are peened down. But, Kieserling does state that both Figs. 7b and 7c are for the *same* purpose, providing resistance "in *both* directions" not the case with his open kerfs shown in Figs. 5 and 7a. His Fig. 7b shows this retention in "both" directions by running his coil through the hole in his spacing member, and the same retention, for the same purpose, in the rectangular cuts of Fig. 7c could only be accomplished by "peening" them. Kieserling also discloses the functions of *complete* retention of the rings in his Fig. 2, where the rings are retained by bending the spacer around each ring, as described in page 319 of the record.

Appellant's witness Thayer states that "peening * * * was well-known in the metal working art before Vandenburgh" (171) and that he "imagines" that Kieserling accomplished the *obvious purpose* by the *obvious method* of having the cuts "pounded down. * * * That would be the natural thing to do, that would be the assumption" (172). "I would imagine that could be done" (173). The old method of peening, in the metal working art, is disclosed in the patent to Prescott & Bennett (233) in Fig. 3, called to the attention of the witness Thayer, the description of the Prescott & Bennett patent (covering a continuous cylindrical coil, held in spacer bars, for the purpose of use as a revolving sand screen) stating the coils in the notches of the spacer to be "*hammered* so as to cover the coil, thereby holding the latter in place on the longitudinal bars" (174).

But we are not called upon to rely upon a direct, specific and complete anticipation. The concrete engineer, desiring to use continuous cylindrical coils, held in spacer bars, for the columnar construction recommended by Considere, must apply to the manufacturer in the metal working art for the production of his structure, or employ metal workers himself therefor. Appellant admits that column hooping, as a type of construction, was old, but contends that his combination was novel, in that it included the "kerf and over-lapping spur," as an element in his combination of the entire structure and that it was new to use such element in such particular combination.

Thayer admits that:

> "It was old at that time in metal working and engineering, wherever you had occasion to connect a transverse and longitudinal member, to connect it by tying it with wire, using a clip, using double interlaced longitudinals, so as to embrace the trans-

verse members in the twisting of the longitudinals as in the weaving of wire mesh, and wire cloth, and that sort of thing, or by welding or riveting, or by *integral prongs* or *tongues punched out* of a metal member, a longitudinal, or by cutting *diagonal* cuts into the longitudinal in some places, or by cutting *right angle* cuts into the diagonal and longitudinal and so forth." (131).

The "kerf" in the edge of the spacing member, *and* the "overlapping spur" specifically was old (235).

Various publications showing numerous types of affixation by the metal worker of the longitudinal to the transverse member are shown in Appendix "C," (*infra*, p. 57) if further consideration of the prior art in this respect is called for.

The engineer or metal worker, in case of any particular structure, adopted such well-known method of affixation as appealed to him as most desirable from the standpoint of results to be accomplished, economy of manufacture, desirability for transportation or other handling, etc. etc.

After his witness had made the admission above as to the wide variety of methods of affixation available, appellant's counsel conceded that they were all old (174, 175).

Appellant's witness Thayer testified that, except as excluded by the rights of prior patentees, anyone desiring to use a structure involving longitudinal and transverse members connected, could, as to method of affixation "pick out the one that was most suitable" (132). "The question of expense, convenience and function to be attained in each case control an engineer free to make a choice in the adoption of a particular choice" (133, 134). "Hyatt (referring to Fig. 4, shown on page 340 of the record, of a concrete reinforcing design show-

ing a continuous coil 'preferably riveted' to a spacing bar) meant (by the description 'the tie c may be riveted, or *otherwise* attached to the metal skeleton') that *he* thought that a riveting attachment was the best way but that he *left it open* to attach the spiral to the tie in such manner as the *particular constructor* preferred to select from the *means available in the arts*'' (138, 134, 135).

It hardly seems necessary to go further to reach the conclusion that it was not invention but merely mechanical skill, to use the ''kerf and over-lapping spur'' of the prior art in the *continuous* encircling spiral reinforcement of the prior art, as a ''preferred'' (by the particular constructor) means of affixing the spiral to the spacer, in view of the decision of this Court in

Berger Manufacturing Co. vs. Trussed Concrete Steel Co., 257 F. 751.

The record in that case disclosed that:

> Metal lath was old and well known. Steel beams consisting of a flat sheet of steel rolled into the shape of a ''U'' (channels) had been long known. Tongues punched out of sheet metal for the purpose of fastening transverse metallic members, as in the fencepost patents above referred to, were also old. But no one, prior to Caldwell, had conceived the idea of punching these tongues out of steel channels so as to attach perforated metal lathing thereto by bending the tongues over the strands of the lathing so as to fixedly and rigidly form the metal studs and the lathing into rigidly co-operating members. Caldwell conceived this combination and patented it as a combination. There was no question but that the construction of the defendant was exactly the same as that of Caldwell. Previous to Caldwell metal lath had been used with this metallic studding by the cumbersome and slow method of wiring it to the studding. This loose method of connection did not make the different members integrally cooperate. The method of Caldwell was unquestionably better.

Upon these facts, this Court said:

> "It must be conceded that the complete combination specified in the claim is *not practically* anticipated, that it possessed commercial utility, that it has gone into considerable use, and—more important than all—that metallic studs or supports and metal lath had been used in combination for a number of years and fastened together in different ways *without adoption by any one* of the *specific* methods of *fastening* here disclosed."

Nevertheless, it was *held* there was no more invention than in any substitution of familiar equivalents as of a screw for a nail.

Considering the state of the art as now disclosed, to sustain a patent such as that of appellant would subvert the very purpose of the patent law, by preventing instead of encouraging the development of the arts, by tying the hands of those who would naturally progress, in favor of one who did no more than to conceive as patentable what others assumed to be usable as a matter of course and therefore did not seek to patent.

Often as it has been quoted with approval, it may not be amiss to again quote from

Atlantic Works vs. Brady, 107 U. S. 192, 205, 2 Sup. Ct. 225.

> "The process of development in manufactures creates a constant demand for new appliances, which the skill of ordinary head-workmen and engineers is generally adequate to devise, and which, indeed are the natural and proper outgrowth of such development. Each step forward prepares the way for the next, and each is usually taken by spontaneous trials and attempts in a hundred different places. To grant to a single party a monopoly of every slight advance made, except where the exercise of invention, somewhat above the ordinary mechanical or engineering skill, is distinctly shown, is unjust in principle and injurious in its consequences.

"The design of the patent laws is to reward those who make some substantial discovery or invention, which adds to our knowledge and makes a step in advance in the useful arts. Such inventors are worthy of all favor. It was never the object of those laws to grant a monopoly for every trifling device, every shadow of a shade of an idea, which would naturally and spontaneously occur to any skilled mechanic or operator in the ordinary progress of manufactures. Such an indiscriminate creation of exclusive privileges tends rather to obstruct than to stimulate invention. It creates a class of speculative schemers who make it their business to watch the advancing wave of improvement, and gather its foam in the form of patented monopolies, which enable them to lay a heavy tax upon the industry of the country, without contributing anything to real advancement of the arts."

If authorities on the question of non-invention in the use of mechanical skill in adopting from one construction to another elements deemed expedient by one constructor or another, are needed, a list, calling attention to the nature of the adaptation, will be found in Appendix "D" (*infra*, p. 63).

THE APPLICATION FOR A REISSUE CONSTITUTED A CONCESSION BY APPELLANT THAT HIS ORIGINAL PATENT DID NOT COVER THE INVENTION NOW CLAIMED: AND A BROADENING OF THE CLAIMS WAS INVALID, EVEN THOUGH OTHERWISE JUSTIFIED, IN VIEW OF THE INTERVENING RIGHTS OF DEFENDANT AND OTHERS.

That the new claims upon reissue were invalid has been held or assumed by every court that has considered this patent. A reference to those opinions is sufficient on this question.

Even if the new claims upon reissue had been justified by the character of the original invention, nevertheless they were invalid in view of intervening rights. The law as to intervening rights as against reissue patents is too well settled to require citation of authority.

THE REISSUE WAS INVALID BECAUSE THERE EXISTED NO JURISDICTIONAL FACTS JUSTIFYING THE REISSUE. THE ORIGINAL PATENT WAS SURRENDERED UPON REISSUE. ACCORDINGLY, APPELLANT HAS NO PATENT AT ALL.

We expect the court to dispose of the case otherwise, so that it may not find necessary consideration of the argument under this title. But, believing the point well taken, we submit it, like the further question of non-infringement, out of abundance of caution.

The law authorizes a reissue only upon one or the other or both of two grounds. The original patent must have been invalid because the inventor claimed *more* than he was entitled to claim; or the inventor must have

inadventently erred in his specification and claims. Unless one or the other of these grounds exists, there is no jurisdiction or authority to grant a reissue, and an attempted reissue is a nullity as such. Neither ground for reissue existed in this case. No claims were narrowed. The new claims were broader claims, and invalid as such. There was no error in the specification. There was no change in the specification except to correct the typographical error in the printing of the word "end" instead of "edge" in claim 3. This misprint in the instance of the original patent did not affect its validity. Both courts of appeal have so held (258 F. 143, first sentence of second paragraph; 263 F. 96, second sentence of first paragraph, and middle of second paragraph on page 97). Appellant makes the same claim in his brief (Br. 39).

The statute expressly requires, as a condition for obtaining a reissue, and without limitation as to whether the reissue is valid or not, that the original patent shall be surrendered.

One seeking a reissue is required, as a condition of attempting to secure something better, to give up what he has. If he fails to secure something better he is in the situation of the fabled dog at the brook who dropped his substance in an effort to secure a shadow.

An inventor who secures a reissue to be granted him without jurisdiction, lacking any condition authorizing a reissue, has no patent at all.

There are moral and equitable, as well as technical reasons for this result.

The contention is, we believe, fully supported by the argument and authorities set forth in Appendix "E," (*Infra*, p. 69).

UNDER ANY CONSTRUCTION OF THE PATENT AND CLAIMS WHICH WOULD SUPPORT THEIR VALIDITY, THERE IS NO INFRINGEMENT.

All of the courts have held the appellant's patent to be a paper patent entitled to consideration only as such, and, at the best, involving, if invention at all, but a narrow advancement in the art, limited to the use of the specific device of the "kerf *and* overlapping spur" for connection of the members.

Judge Orr held that "if, by any possibility, the patent can be held valid, it is most limited in its scope. If valid, and thus limited, there has been no infringement" (259 F. 581). The Court of Appeals sustained this contention as the easiest way of disposing of the controversy (263 F. 97). We will discuss the basis of this decision more in detail later. Circuit Judge Hough found that "the only invention revealed by the specifications is the *exact* construction described in Figs. 1-6" and that there was no infringement. However, Judge Hough's conclusion as to no infringement was based on the idea that the construction described as a "concrete steel spiral" on page 211 of the record was not "rigidly" retained, but was collapsible. The Court of Appeals in the Second Circuit held that collapsibility was merely a commercial improvement including the elements of the original structure of appellant, as that structure was assumed in the court to be in the course of the limited presentation of defences apparent from opinion. Were it necessary, we might argue against the conclusion of the Court of Appeals of the Second Circuit on the theory that to open up the, by it, concededly rigid attachment of appellant so as to make the structure collapsible, was not an *addition* of a new ele-

ment, by way of improvement upon appellant's device, but a creation of something entirely different in that it *eliminated* the element of rigidity and employed the entirely *different* element of collapsibility.

The cursory manner in which, other than as to the question of collapsibility, the merits of appellant's patent were presented to the Circuit Court of Appeals is disclosed in the statement in the opinion: "The defendant's witness Cummings *frankly admits* that this form of reinforcing structure was new in cement work and has come into general use." This in an outright misunderstanding of the record. We are told in appellants brief here that the record in the New York case was made up from excerpts from the record at Pittsburgh. We have before us the Pittsburgh record and are unable to find therein a syllable justifying this statement by the Court of Appeals of the Second Circuit. It was intended to use the witness Cummings at the trial in the court below. He failed to arrive on time. It was agreed that his evidence from the Pittsburgh record should be considered. To save appellant extra expense, and considering Cumming's testimony as not necessary to our defence, it was stipulated out of the present record, with the agreement that it might be referred to, if desired "as a physical exhibit" (484). We challenge opposing counsel to quote therefrom in support of the statement of the Court of Appeals that Mr. Cummings made the admission stated in the opinion of that court.

Judge Westenhaver correctly thought that he might have disposed of the instant case on the ground of non-infringement "were I to adopt the limited and narrow construction given to the claim by the Third Circuit Court of Appeals" (470), but preferred to dispose of the case upon the broader grounds.

As a precaution, we decline to waive the question of infringement. The "over-lapping spur" is as much an element of claim 3 as the "kerf." The claim was procured by including *both* these elements. The Patent Examiner might have allowed the claims because, although he knew kerfs, he was not familiar with kerfs "*having* an integral overlapping spur." A kerf is any sort of a cut. Appellee has a kerf in its "T" bar. But, as noted by Judge Westenhaver, "the kerfs of plaintiff's patent required to be cut at an *inclined angle.*" The use of the term "kerf" in the claims must be understood with reference to the kerfs disclosed in the description; and these were inclined kerfs. Appellee's kerfs are not inclined. A "spur" is a form having a distinct meaning, something projecting out beyond the main body, as the original spur of the equestrian, the spur of the rooster, the spur track of the railroad. Appellant created such a spur. Appellee did not. Holding adjoining metals in place by hammering down is a totally different thing. It had been used for ages by mechanics deeming this method of retention desirable. Appellant's spur completely "overlapped" and extended only from *one side.* Appellee's construction involves hammering or peening on *both* sides, and neither side *over-laps* the spiral. It is a wedging effect and not an over-lapping effect. Details of appellee's construction appear at page 217 of the record. Appellee's spacing bar is not a rectangular bar at all, and it does not have its kerfs in the "edge" of the primary bar. It is a "T" bar. The flat top of the "T" is the *primary* spacer. The leg of the "T" is provided as an *auxiliary* in order that *cuts* may be made therein without *weakening* the *primary* member. The attachments proceed from the back of the primary member, not upon the edge. They are the same in this aspect as if there were protruding from the back of the spacer, at the necessary in-

tervals, *disconnected sections* for attaching purposes. Those parts of the continuous leg of the "T" between the points of attachment are simply waste material, wasted because it is cheaper to construct the spacer in that form than to save the metal by having *independent* protrusions *at intervals.* The attachment is just as much upon the "back portion" of the spacer as in case of the device held by Judge Buffington not to infringe.

The structure held by Judge Buffington not to infringe is shown in Fig. 6 on page 279 of the record. If there is anything in the "edge" distinction, the edge cuts of Fig. 5 on page 279 of the record had been disclosed by Banks 13 years before appellant's application (363) specifically as a means for attachment of concrete-encircling bands to the spacers for holding them respectively in place.

All manufacturers of column hooping use at least *two* spacers, located opposite each other. One would be ineffective for the purpose of holding the encircling bands or continuous spiral at the equal spacing necessary to utility during the process of pouring the concrete. If there were a spacer only on one side, the bands or loops would be free to bunch together or separate on the other side of the column under the influence of the process of tamping the concrete. There is a totally distinct *function.* That plaintiff had no conception of a structure thus effective for the hooping of columns is apparent. Except in his detail Fig. 6, showing two beam bars, *each* with its own independent set of diagonals, opposed in the familiar method of the use of beam reinforcing for column construction, he shows in every instance a *single* bar, wastefully heavy in its proportions in relation to the diagonals for mere spacing purposes, and, even in Fig. 6, without a bar on opposing sides of the loops. His disclosure does not suggest the use of opposing spacers. In

claims 1 and 2 of each the original and the reissue patents it is stated that the coils are "*free* of said bar at the opposite side therefrom to the securing point." When the Examiner cited the Swiss patent to Münch (410) against his application, appellant distinguished his structure on the ground that he only had one bar and not two, so that one end of his diagonal coils was "free" of the bar. Says appellant to the Examiner: "The reference device shows a different form of brace where the wire simply extends *between two* bars" and "does not have the *free* coils disposed *beyond* the bar" (437-8). "The Swiss patent which is relied upon by the Examiner shows windings carried by *parallel* rods and *not* secured to *either* of the rods * * * and *even* if *one* of the rods be *removed* would not anticipate the appellant's invention because the *remaining rod* not being attached to the coil could not retain it in operative position" (441).

As to the distinction between the use of two opposite bars for *spacing* purposes and the use of one longitudinal for *reinforcing*, with the coils attached to bars on *both* sides for columnar encircling reinforcing, and the coils "free" of the bar for beam reinforcing, we think the proposition of non-infringement absolutely clear. We appreciate that the contention of non-infringement upon the distinction in respect to the method of attachment (assuming the disclosure of appellant to be a spiral continuous in one direction, otherwise adapted for use as hooping for columns) is based upon narrow distinctions. If Judge Buffington had regarded appellant as any sort of a pioneer in the art, he would never have held non-infringement on account of a difference merely in method of attachment. His decision was simply the easiest method of disposition of an extremely questionable patent, which had made "no impression on the art," saving the

court the trouble of trying to find out what was involved in the other contentions the attorneys were attempting to present.

We merely add the question of non-infringement. We feel that this Court, like the court below, now that the merits and demerits of this patent have been fully presented, should broadly dispose of the patent as wholly invalid, protecting other manufacturers and other courts from the annoyance of considering this paper patent, and incidentally saving the appellant from the expense of preparing fourth and succeeding records and briefs on appeal.

Respectfully submitted,

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APPENDIX "A."

UNITED STATES DISTRICT COURT,

SOUTHERN DISTRICT OF NEW YORK.

George E. Vandenburgh,
vs.
Concrete Steel Company.

Final hearing in Equity. Action on Claims 1, 2, 3 and 5 of Re-issued patent to Plaintiff, No. 14182. Original patent was No. 841741, of which the application was filed May 9, 1906, patent issued January 22, 1907, surrendered and re-issue prayed July 1, 1916, re-issue granted August 15, 1916.

J. H. Griffin, for plaintiff;

L. E. Varney, for defendant.

MEMORANDUM DECISION.

A formal statement of the alleged infringement clarifies this situation. Defendant makes and sells a "collapsible spiral" (Deft's Ex. 5, p. 6) used for strengthening concrete construction, consisting of a cylindrical helix of steel wire fitted (usually) to two "Spacers" a diameter apart, and each engaging every convolution of the helix, of which the rise is so slight and the engagement with the "spacers" so loose that the construction which is normally stove-pipe shape, can by moving the metal rods called "spacers" longitudinally in opposite directions be flattened out and then conveniently crated for transport.

These "spacers" are *not re-enforcing bars* in the sense that they are a calculated addition to the ultimate strength of the steel and concrete structure; their function is only to hold the spiral in place until the concrete

is poured,—but, of course, they are of metal and do contribute whatever strength they possess—so would any other casual piece of steel.

To this apparatus there are *two essentials*, one that the helical convolutions be close, and second that the wire be so fastened to the "spacers" that it can turn in place; unless both of these conditions are fulfilled it cannot *collapse*.

That this is not the exact thing Vandenburgh invented is too plain for argument; the assertion is that a wire spiral fastened to one piece of metal, such as defendant's "spacer," in the manner commercially used by defendant, and intended as an aid to concrete building, embodies the claims in suit; the *addition* of another spacer is *immaterial and collapsibility* is a function or attribute of what the claims define.

Whether the claims of the re-issue do read on defendant's structure, is not a matter requiring much consideration. If such be the case, it does not prove but only suggests infringement.

Nor, on the other hand, shall I spend time in dwelling on the "*paper*" nature of this patent. The style of strengthener for concrete now called infringing has been in growing use since 1907, but there is no proof at all that plaintiff has contributed to that growth, unless one is to believe that the mechanic world was moved by Fig. 4, the only portion of the disclosure suggesting even now defendant's device. On this evidence it is clear that McClure 857821, which issued a few months after the patent in suit, should have had a vastly greater influence, because its suggestions are so much more distinct.

It is preferred to ask what is always an important and often the vital question,—what did Vandenburgh disclose?

His specification has remained substantially the same, since date of application; there were no changes of substance in the office and the reissue was sought only to procure a change of claims. The invention has always been described as a "*reinforcing bar,*" which is to be "embedded in the plastic body to be supported thereby." Bars were old, therefore novelty in construction must be shown and it is disclosed that this bar is to be provided with "*one or more* spirally disposed coils *secured* to the bar," and forming a *truss* within the body of concrete. This securing of coils to bar may be "in any desired manner," but the preferred and disclosed means to a "series of kerfs in one face of the bar *inclined away* from the *center of the bar* towards the *opposite ends* thereof; in one of which kerfs each convolution of the wire coil was inserted and the spur or lip of each kerf "*forced downward* upon the coils"; thus the hammered down kerf-spurs "*permanently retain*" the wires "*in position.*" There was nothing new about this method of retention (Clark 589593), while as for the mere act of fastening by any means a rigid metal bar longitudinally along a cylindrical helix of wire, I have only to look at the spring holder for pens and pencils now before me and in the same use on my desk for twenty years last past.

Evidently, therefore, the patent could not generically cover a style of construction of which the elements are a coil of wire combined with any sort of metal rod secured to each other in any way as often as the periphery of the spiral touched the longitudinally placed rod. Unless the *disclosure* does first reveal this fundamental novel thought, it may be doubted what defendant does within any justifiable range or equivalency; but decision is grounded on narrower considerations.

I have quoted substantially all the verbal description of invention, and as soon as the drawings are examined it is seen just what Vandenburgh meant by a "truss," and exactly how he made one, and why he wanted it strong, fixed and rigid. Fig. 1 and its detail Fig. 3, with interlacing coils pointed away from the middle point of the ultimate completed construction, is a true truss frame, firm and rigid (except for probable resiliency or elasticity or wire) before any concrete poured. Fig. 4 shows a single wire, a cheaper and weaker device, but identical in theory. This is Vandenburgh's invention; he never disclosed collapsibility; what he shows will not collapse; what he does show bears scarcely a remote resemblance to what defendant makes and sells.

It is urged, however, that whether Vandenburgh saw the possibilities of a mere spiral guide for concrete or not, he disclosed the fact. If so, it must be by Fig. 4 alone. But, as said above, this is called "a modified form using one coil"; using one coil for what? Of course, for the same purposes and in the same manner as he preferred to use a double coil; i. e., so as to be rigid, truss-like and non-collapsible.

Turning to the re-issue, it is found that claims 1 and 2 originally called for a spiral coil "rigidly" secured to the reinforcing bar; as re-issued the phrase is "permanently" secured. The evidence makes it plain that this change was made to catch manufacturers like defendant, but I shall not consider intervening rights, because it is thought clear that rigidly is exactly what the patentee meant. This is seen from the nature of his "truss" and the representations made in argument to the examiner. (Original file wrapper, Amendments A and B).

Claims 5 (original 4) and 3 are in too general language. They go beyond the disclosure, exceed the in-

vention and are false claims unless construed to mean by "*retained*" rigidly fixed in place, and (5) by "kerfs disclosed diagonally," kerfs inclined half one way and half the other—substantially as shown.

In result, it is held that the re-issue was unlawful as to claims 1 and 2 if "permanently secured" differs in meaning from "rigidly secured" because the specification meant "rigidly secured," whether this invalidates the re-issue need not be discussed. Further held that Claims 3 and 5 are not infringed by defendant, and finally held that the only invention revealed by the specification is the exact construction described and pictured in Figs. 1 and 6.

Bill dismissed with costs.

May 13, 1918.

APPENDIX "B."

Appellant did not Invent "Column Hooping" at all and Had no Idea That He Had Made Such Invention Until After Column Hooping Came Into General Use. Practical Men, Expert Witnesses on Both Sides Below and the Patent Office Saw Nothing in Appellant's Patent Suggesting Column Hooping.

"Column hooping" is a well recognized name descriptive of a continuous spiral or independent bands, held by spacer bars intended to serve no function except to hold the spirals or bands in place until the concrete is poured, leaving the spiral or bands located around the column as near its outside perimeter as consistent with fire-proofing and the binding enclosure of the spiral or hoops within the concrete, for the *purpose* of resistence to the tendency of superimposed weight to cause the concrete to *spread laterally* and break or spawl.

The term "bar" or "reinforcing *bar*" of the patent in suit is also well recognized as descriptive of steel used in the reinforcement of concrete for a *totally different purpose* hereinafter specified.

Any beam supported at its opposing ends and subjected to an undue weight fractures either by the stretching, against tension, of the lower part, or crushing or crumbling or buckling, under compression, of the upper part. In a beam of a homogeneous material, such as structural steel or wood, the failure is in the bottom in tension or at the top in compression, according to the material. The tensional strength of an ordinary structural beam is such that it will buckle in at the top. A wood beam will stretch and break at the bottom. In a reinforced concrete beam, resistance to these respective stresses is furnished by the two different materials.

The steel at the bottom resists the tension. The concrete at the top, negligible in tension, resists the compression. This was the original reinforced concrete beam. It could, of course, like a beam of any material, be used as a column by standing it on end. But, in case of a beam on end, the resistance is solely to the compression of the superimposed load, except, that if the load is superimposed *eccentrically,* it will tend to bend the beam, and so develop opposing stresses of extension and compression. Originally, reinforced concrete beams were used as columns, except that, because the eccentric loading might develop bending in any direction, "reinforcing *bars*" were placed *opposite* each other, near the outside of the column, to furnish tensional resistance according to the location of the load. Of course, these reinforcing bars afforded some, but not much, resistance to compression, depending upon the quantity in sectional area of the steel used.

In the practical use of concrete beams, as beams, it was soon discovered that there was a still further stress to be resisted. In the breaking of a reinforced concrete beam under load, there is a tendency to diagonal fracture of the concrete, not developed at all in the center of the beam, but increasing toward the respective ends of the beam, as illustrated on page 423 of the record. To provide a "reinforcing bar" which would not only furnish tensional resistance longitudinally, but strengthen concrete beams against this *diagonal* fracture, the president of the appellee company, the witness Kahn, invented the idea covered by his patent of 1903 (248) in which diagonals running obliquely from the "reinforcing bar" *oppositely* toward the respective ends of the beam were provided either by diagonals bolted on as in Fig. 10, or integrally punched from the bar, as in Fig. 4, or sheared

from the edges of the bar, as in Fig. 8, or looped into the bar as in Fig. 24, *et seq.* Kahn contemplated the use of this *bar* in columns, as simple straight reinforcing bars had been used in columns, by placing a bar on each side or corner of a beam used as a column (253).

Other inventors followed with other ideas in respect to incidental opposing *diagonals* attached to the main "reinforcing bar." Pohlman, like the appellant, thought that a *looped* diagonal member would serve the purpose better than a single *straight* member (262). Pohlman had *his* specific idea of providing the loops. Peabody (265) thought it would be still better to have *double* loops for his diagonals, and that it was desirable to attach them as indicated. Golding (268) thought it better to use a loop the *bend* of which would be *longitudinal* of the bar instead of transverse to the bar, and disclosed a method of attaching such a loop to his main "reinforcing bar."

All of these patents on *opposed diagonals* were issued before appellant's application.

Our contention is that appellant's only conception was of still *another,* and, by him believed-to-be-more-desirable, method of providing the diagonal and *oppositely extending* loops as *auxiliary* to a *main longitudinal* "reinforcing *bar.*"

Kahn's patent was issued in 1903 (250). Appellant does not claim to have even commenced with his conception until that year (96). He had used Kahn's bars with the prongs for beam construction (93). The abbreviated record does not disclose the date. Kahn's bar consisted of a "*main* metallic strengthening member, with a plurality of *auxiliary* members" (line 76, p. 253). As explained by Kahn in his patent (252), the idea of the opposing diagonals is to develop a *truss* action; "and has

for the primary object the obtaining of a trussed construction in which a portion of the trussed members are formed by metal and the remaining portion by concrete or cement * * * the *main* members (the primary reinforcing bar) correspond to the chords of a *truss,* and the *minor* members (the diagonals) to the web. * * * the metal is arranged to correspond to the tension members in the *ordinary Pratt* truss" (lines 12, 68 and 75 *et seq.).* "The diagonal members only of a part of a *truss"* (claims 1 and 4). The original name of the appellee company was "*Trussed* Concrete Steel Company."

Appellant's *original* idea was of a *better* "reinforcing bar" or "bar," a she calls his structure throughout the patent, for the purpose of resisting *tension* and *diagonal* stresses in his *beam.* In the language of claim 3, the only possible valid claim in issue: "A reinforcing *bar* * * * *with* etc." The "bar" is *the* thing. His only idea of using it in a column was the idea of his predecessors of making a beam serve as a column by standing it on end, but, in such use of the beam, to employ a *plurality* of *opposed* "bars." The only reference in the patent to columns is as follows:

> "In Fig. 6 a modified application of the invention is shown where *two* of the bars are disposed parallel to each other, with their coils intermeshing, for use in a column or *girder* construction."

Column hooping, as manufactured by defendant, could not be used practically in a "girder" at all. As appellant's structure was to be used in *either* beam or girder, it could not be column hooping. It must be *primarily* a "bar" for beam.

Appellant was going to have a better "bar" than Kahn by employing, like Pohlman, Peabody and Golding, *loops* instead of straight *diagonals,* on the theory that

the loop of the "*oppositely* extending" diagonals would get a better, and enclosing, grip on the concrete. That appellant did not have the conception of a spiral *continuous* throughout the length of his complete reinforced structure is clear from the fact that he, like Kahn, proposed "to form a *truss* within the body of the concrete" (line 19, p. 213); "and provides the necessary strength upon which the *truss* structure formed by the *coils* is carried" (line 99, p. 213). This "truss" action could not be developed by a spiral *continuous* in one direction. To develop the truss action, it is necessary that the auxiliary members *incline* in *opposite* directions from the center. And that there might be no doubt about this, appellant says:

> "This preferred construction (the "preferred" in this connection referring to the preference in the use of two coils, instead of one) is shown in Figs. 1 and 3, and it is also desirable that *both* (that is, each of the two sets used in the preferred construction) of the coils be deflected away *from* the *center* of the bar, as shown in Fig. 1" (line 69, p. 213).
>
> "These coils being extended in *opposite directions* and embedded in the material, provide" etc. (line 11, p. 213).

Even the kerfs, inclined because the coils are inclined, are "inclined *away from the center* of the bar towards the opposite ends" (line 8, p. 213).

In the Patent Office, appellant distinguishes his structure from that of the Swiss patent to Mollins (403) showing encircling coils pointing out to the Examiner "that the Swiss patent does *not* show the wire deflected toward the *opposite* ends of the bar" while in appellant's structure "the spiral strands when embedded in the concrete form a structure extending continuously *from* the center *toward* the *opposite* ends of the bar" (442).

The contention that appellant did not, at any time, contemplate a coil *continuous* in a single direction, but only *either* one or two coils, the direction of which should be *reversed in the center,* so as to create the oppositely extending *diagonals,* was never presented to any of the courts until in the court below. But Circuit Judge Hough notices this element of the patent as a premise to the conclusion that appellant's affixation was "rigid" (*supra,* p. 39), because this *truss* action could *only* be secured by *oppositely inclined* loops rigidly seated in oppositely inclined kerfs so as to *retain* the wires in these oppositely inclined positions.

The court below did not definitely determine this question, because it considered that the decision must be against the appellant even "*assuming,* without *admitting,* plaintiff's contention (that he disclosed a *continuous* spiral) to be true."

The various opinions written on the patent in suit disclose that no denial was made by any defendant, prior to the trial in the court below, of appellant's contention that Fig. 4 of his patent showed a coil continuous in one direction, so that the only questions elsewhere raised pertained to whether there was patentable invention in inserting such a continuous coil in a bar by means of the kerf and overlapping spur and whether such insertion was originally contemplated by appellant to be a rigid insertion instead of the collapsible connection of the respective defendants. But we confidently assert that Fig. 4 does not disclose a spiral continuous in one direction. Figs. 3 and 4 are only details of *one half* of the *complete* "reinforcing bar." Fig. 3 is intended to illustrate in detail how two loops, *each* extending *diagonally from the center* toward *that* end of the bar, may be employed

to increase the grip upon the concrete, although a single coil may be "sufficient in light construction." Where two coils are used, they are wound, on the respective halves of the bar, away from the center so that "coil 7 * * * extends in the opposite direction to coil 6 and through the same so as to cross beneath coil 6 at a point directly above the bar, thus providing a construction in which all lateral pull or strain of the coil is avoided, owing to the equalization thereof by the oppositely-extending (that is, oppositely extending as between the two cooperating) coils, and the tendency of the coils to move or flatten toward the face of the bar resisted." It is expressly stated that "this preferred construction is shown in Figs. 1 *and* 3" thereby expressly showing that "1 *and* 3" disclose the *same* idea, so that Fig. 3 is but an elaborated detail *of part* of Fig. 1. In respect to this reference to Fig. 3 as a detail of Fig. 1, it is immediately thereafter stated "and it is also desirable that *both* of the coils be deflected *away from* the center of the bar *as shown in Fig. 1.*" "Fig. 3 is a *detail* perspective of the primary and secondary coils *shown in* Fig. 1." So there can be no question but that Fig. 3 is not intended to illustrate double coils each continuous in one direction throughout the length of the bar. Then, *immediately following* the last quotation, it is further stated: "Fig. 4 is a *similar* view of a *modified* form using *one* coil." Therefore Fig. 4 is a detail of one-half or one part of Fig. 1, (just as Fig. 3 is expressly stated to be) except that it uses one coil instead of two. The element of "truss action" could be attained only by having the single coil of Fig. 4 *change its direction* in the *other* half of the bar on the other side of the center.

Neither of the courts of appeal appear, from the opinions, to have had called to their attention for consideration the question of whether appellant had ever disclosed for any purpose such a structure as a *continuous* spiral attached to a spacing bar.

Circuit Judge Hough considered this upon the question of rigidity or collapsibility, finding that Fig. 4 did not disclose collapsibility because it only showed a *modified* use of the coil in a *truss* construction, which necessarily would not be collapsible. He said:

> "It is urged, however, that whether Vandenburgh *saw* the possibilities of a *mere spiral* guide for concrete or not, he disclosed the fact. If so, it must be by Fig. 4 alone. But, as said above, this is called *'a modified form using one coil';* using one coil *for what? Of course,* for the *same purpose* and in the *same manner* as he preferred to use a *double coil;* i. e., so as to be *rigid, truss-like and non collapsible.*"

Judge Orr also found non-collapsibility for the same reason, quoting the reference to "form a truss" and to the "oppositely extending coils" to show that "the structure of the patent is not collapsible. The quotation above indictes it" (259 F. 580).

Judge Westenhaver passed the question, which was directly submitted to him, as immaterial even if the appellant's claim as to Fig. 4 was conceded (469).

Professor Turneaure, Dean of the Engineering School of the University of Wisconsin, author of one of the three leading works on the subject, who, appellant's expert says, "stands very high in the profession" (138), and whose qualifications were admitted by appellant's counsel (49), could not find in the patent in suit anything but a structure pertaining to beam construction either

as a beam direct or as a beam used as a column. He saw no suggestion of columnar construction of the column hooping type:

> "I take figure 4 as a mere detail or piece of figure 1, because in the decription it refers back to figure 1 in mentioning figure 4. Figure 1 shows the entire construction and figure 4 a mere detail, assuming a single coil. Figure 3 shows how the thing can be made using a double coil. In figure 6 all of these coils are inclined in the same manner as they are in the diagram in figure 1. It does not appear that they suggest at all the fundamental notion of spiral and hoop reinforcement as the *primary* reinforcement. Furthermore, figure 6 illustrates what has been done with other kinds of *beam* reinforcement when *used in* columns. When put in there, it would give the idea these diagonals do some good, but it is not a very scientific arrangement.
>
> "Figure 6 is impracticable because the coil is bunched together like that, and it does not occur to me you would get a very good job of concrete, and it does not appear to me you actually could with the coils so closely meshed together as indicated in that figure. The coils would interfere with the tamping of the concrete. You could not get a good quality of concrete." (63.)

Profesor Turneaure's analysis of this patent and his explanation of the principle of truss action are found fully on pages 61 to 64 inclusive. His explanation of beams and beam stresses, and the purpose of adding the diagonals of Kahn to the original plain reinforcing bar; his references to the development of patents on diagonal attachments to reinforcing bars; his distinction as between column stresses and the purpose of column hooping, as distinguished from up-ended beam construction, and the distinction that in "reinforcing *bars*" the *longitudinal* "*bar*" is the *primary* functional member, the

diagonals, rods or loops, being *auxilliary,* while in "column hoping" the coil is *primary* and the longitudinal spacer merely *incidental* to correct placement *during construction;* all appear on pages 49-60, inclusive of the record. It is all well worth reading *in extenso.*

Appellant placed on the stand a witness named Thayer, a teacher in the Carnegie Institute, who had not contributed substantially to literature directly on this subject. The principal purpose of his examination in chief was to testify that he had examined the Pittsburgh record before the Court of Appeals of the Third Circuit and found the prior documentary art *substantially* the same as in the *abbreviated* record in the Second Circuit. Opportunity was afforded for extended cross-examination by appellee. At the outset, it disclosed that his comparison was cursory (125-127).

This witness admitted that he was a partisan (132). He disliked embarassing details. He preferred to generalize. He endeavored to dodge and evade efforts to pin him down. Nevertheless, when cornered, or when speaking without appreciating the effect of his statements, he *verified practically everything testified to by appellee's expert* or argued under this particular heading of the brief.

After admitting that Fig. 2 of the patent in suit was merely a "detail," and then that Fig. 3 was *also* a "detail" showing the arrangement of *one-half* of a bar using double coils, "reversing in the middle" (161-162), he was asked if Fig. 4 was not *also* a detail. Beginning to grasp the force of this examination, he attempted to hedge (162), but finally acknowledged that Fig. 4 was also a mere detail (163), and finally admitted, in effect, that Fig. 4 *could not* represent "a single *continuous* coil running in the *same direction* of spiral on *both* sides of

the *center*'' (166) as an element of the beam construction which was the principal idea of the Vandenburgh patent, or at least, that if it did, it would not work, because the witness could not ''agree with him (appellant) as to his idea of the action of the beam or column under stress.'' The *continuous* coil of *column hooping* could not be used in *beams at all.* ''That action is a different matter entirely. The theory of *beam* action and the theory of *hoop columns* is *entirely different.* If you were going to reinforce it to carry as a beam, you would reinforce it *one* way. If you were going to reinforce it as a hooping, you would reinforce it *another*'' (166).

This testimony puts the patent in suit upon the horns of this dilemma as to Fig. 4:

Whatever he had in mind, appellant was going to use the *same* structure, preferred or modified, for *each* columns and beams. If Fig. 4 represented a continuous bar in its *entirety,* it wouldn't work in beams at all. It could only work in beams as representing, not a continuous coil, but *one-half* of a beam with the coils inclined in one direction on one side of the center and inclined in the other direction upon the other side of the center. And this would not be the continuous spiral necessary in column hooping.

As to the differences in stresses and the requirements of reinforcement in columns and beams, except as a beam might be used as a column Thayer agrees with Turneaure (138). He says the purposes of the diagonals are as we have set them forth *supra* under this title of the argument (141)—the diagonals must, to be *effective,* extend ''oppositely from the center'' (142) so as to thereby develop the truss action (164).

Column hooping of the practical art is for columns exclusively. It has no advantages for beam construction. It would be inutile therefor, although, contra, a beam may be used as a column, while not so advantageously as a member properly constructed primarily as a column. "Bars" are used in beams to meet the stress of tension *lengthwise* of the bar. Hooping is used in columns to resist expansion *directly against* the coil. Appellant either invented column hooping, as such, or beam construction which might be, but not so satisfactorily used for columnar support. He couldn't have covered *both* of these *diverse* propositions with *one* structure. Can there be any question that it was the beam he was after?

Appellant's witness Thayer discloses the best of reasons why Vandenburgh made "no impress on the art." He was impractical. Thayer agrees with Turneaure that appellant's Fig. 6, his special suggestion for columnar construction "would not be practicable" (147, 159).

Thayer says appellant's theory of equalizing the strains was erroneous (165, 166). There wouldn't be any tendency to draw coils up at right angles (167). His kerf attachment for beam construction was *objectionable* in that it weakened the tension member and wasted steel (141), the very thing which Golding sought subsequently to avoid (181). His Fig. 4 *would not* do for *column hooping* because it only showed the *single* longitudinal member required in *beam* reinforcement and not the *opposite* spacers required to hold the coils of column hooping in proper alignment until after the concrete was poured. Appellant could not add a *second* bar to his coil and keep within the disclosure of his patent. He claims "coils *extending beyond* and *free* of the bar *at the oppo-*

site side therefrom to the *securing* point" (210). This Fig. 4 would not do for column hooping because the loops, even if continuous, were *spaced much too far apart* for any *effect* in *columns,* however effective in *beams* (140, 159).

Appellant continually refers to his device as a "bar" or a "reinforcing bar." The *longitudinal* member is of *many times the sectional area* of the material of the loops. This is the proper relative proportion of metal if the longitudinal bar is to serve to resist tensional strains, as the *principal* element, and the diagonals only to protect against oblique fracture, transmit the stresses from the body of the concrete to the main bar, and develop the truss action, as *minor auxilliary* elements. But this is a ridiculous proportioning if the structure is intended for column hooping. In column hooping, the spirals are the *principal* members, resisting the transverse expansion of the column, and the longitudinal bars are *mere spacers,* for the purpose of holding the main spiral in proper alignment of convolutions during the pouring of the concrete. The spacers, for economy's sake, are as small as will suffice to hold the spirals in place until the concrete is poured. Thayer says that in column hooping these *small spacers* would not give "any substantial, calculable results in a column." "It would not amount to very much. It would be small. It would not be worth figuring * * * It might really be a detriment. They would serve no substantial function except as a spacer for the spirals" (139). His testimony was directed to the relative sectional area of spacers as used in the practical art of column hooping (89). See cuts of various column hooping construction (211), appellee's construction being Exhibit No. 2. Exhibit No. 1 is a model prepared by appellant. The functional purpose of the

longitudinal bar in beam construction and in column hooping construction is entirely different. *No one having column hooping in mind would have illustrated it by any such drawing as Fig. 4, even if Fig. 4 had been a complete bar instead of one-half a bar.*

Thayer admits that appellant followed Kahn as to beam construction (177), as did Pohlman, Peabody and Golding, *supra* (178, 179): that Kahn showed the application of beam construction, as beam construction, to columns (178, 183, 184), and that Kahn's columns were adapted from beam construction upon the same functional basis as appellant's adaptation of his beams to columnar construction (178).

Thayer futrher testifies that the terms "bar" and "reinforcing bar" used in the patent in suit are *not applicable* to the structure known as column hooping.

> "We would call it a *reinforcing bar* where you *figure it* in the stresses. Where it is *not* figured, we call it a *spacing* bar, provided it is used to hold the spirals in position.
>
> Q. And where a coil was the *main* thing and was the part upon which you *depended functionally*, you would call it a coil, would you not?
>
> A. Yes, 'Hooping' is the term I have ordinarily used.
>
> Q. Hooping is a term that has been well known since Considere? (1903.)
>
> A. Yes." (184, 185.)

> "Q. Well, as an engineering term, intended to clearly describe to another who did not know what idea you had in mind, and you must get his idea of what you did have in mind from the language or term used, would you say that a coil with its convolutions seated in recesses in a spacing bar of such light construction that the spacing member would not be taken into consideration in calculating the

strength resulting in the finished structure was properly called a bar?

A. The term 'bar' is *not* ordinarily used in referring to what they call *spirals,* still they use them at the present time up to one half inch in diameter and they call that a bar.

Q. Where the longitudinal is of a size and design to furnish in itself, whether aided or unaided, the *primary* substantial reinforcing strength, you call it a bar?

A. I would think so." (184.)

And, finally, not only were men like Professor Turneaure, and men in the practical business of manufacturing reinforcing for columns, unable to see in appellant's patent anything applicable to the structure functioning under the term column hooping and neither sought nor accepted licenses from him; but the very Examiner who allowed appellant's patent, and who was subsequently called upon to pass upon other patents, the latter pertaining *directly* to column hooping, was unable to see anything in appellant's application but a *beam* construction. When appellant's original application was pending, and the Examiner was called upon to make references against the application, all were (says witness Thayer) to prior patents on *beam* construction (190), and none were on art applying to columns (193), although the same Examiner had passed the Cummings column hooping patent, under which the Electric Welding Company operated, shortly before the filing of the Vandenburgh application (273 to 286 inclusive). Thayer was right. When appellant's original patent was in the Office, the Examiner understood it to be of such structure and for such purpose (436) that he rejected the claims on Münch (405) elsewhere disclosed (*infra,* p. 34) Mueser (Pittsburgh record 377), an ordinary straight reinforcing bar except

that it had high *integral* corrugations encircling the bar continuously in each direction; Peabody (265), a reinforcing bar with loops extending oppositely from the center diagonally across the line of fracturing shear; and Kahn (Pittsburgh record 373), a reinforcing bar to which Kahn attached oppositely extending diagonal members *without reducing* the size of the longitudinal at the point of affixing the diagonal, as did Golding (268).

Following the issuance of the original patent, and during the same year, there was filed the application of McClure (287) showing continuous spirals held in *kerfed* spacers, and later other applications (290 to 310, inclusive) not only showing continuous spirals in *kerfs* but with *over-lapping spurs* pressed down on the spirals (293). The Examiner, although he had personally passed on the Vandenburgh patent, did not see occasion in the consideration of any of these numerous subsequent applications, to refer to appellant's patent (188, 189). The only conceivable reason for the Examiner not referring to appellant's patent in considering these applications is that the Examiner never saw anything in appellant's application to suggest that the idea of column hooping was involved.

Witness Thayer had to admit that these subsequent patents clearly covered the idea of appellant's invention as the witness construed it (185, 186) so that if the witness had been the Examiner, he would have felt compelled to refuse the allowance of the subsequent patents (188, 189).

If this Court has the time, it would be interesting to read the cross-examination of Professor Thayer in full. Parts of it will be referred to elsewhere in discussing the question of invention.

APPENDIX "C."

No Invention Disclosed in View of Prior Art Patents and Other Publications.

The opinions in the Second Circuit show that whatever prior art may have appeared in the record, there was no challenge of the attention thereto of either the trial court or the Court of Appeals.

Each, Judge Orr and Judge Westenhaver, expressly held that there was no invention, within the rule of the authorities, in view of the prior art.

Long prior to Vandenburgh the idea of circular embracing reinforcement of concrete was disclosed by inventors. Sometimes it consisted of lattice work, sometimes of mesh with supporting braces, sometimes of parallel circular bands affixed to spacers, sometimes of spirals likewise affixed, and sometimes of bands wired around uprights.

Hyatt, Br. No. 1715 of 1874 (340) disclosed in Fig. 1 an interlaced lattice container, and in Fig. 4 a spaced spiral, and it was not a spiral which reversed its continuity in the center either. No method of attachment of the spiral to the longitudinal is disclosed. Hyatt says the spiral "*may* be riveted or *otherwise* attached" (134) and appellant's witness Thayer says: "Hyatt meant that he thought that a riveting attachment was the *best* way but that he *left it open* to attach the spiral to the tie in such a manner as the particular constructor preferred to select from the means available in the arts."

Hyatt's claims were not limited as to method of attachment.

Lee & Hodgson, Br. No. 14,559 of 1885 (349) discloses two spirals, continuous but reversed as directed, held in place by an upright spacer. These patentees

used rivets for attachment (347) but did not limit the claim in this respect (348).

Banks, Br. 12,228 of 1893 (363) discloses a rectangular mesh supported by a series of uprights to which the mesh was held in place by *over-lapping tongues.* "For the said distance pieces I *prefer* to employ strips of thin metal bent to form a cross section of U or V shape with flanges at the edges and I secure such strips with their flanged side against the lathing, the flanges being *slit* so that portions thereof *can be bent around* the meshes of the lathing in order to securely fix the strips thereto" (358) as shown in Figs. 4, 5 and 6 (363).

Coignet, Br. No. 24,371 of 1904 (373), Fig. 8 shows circular bands surrounding and *clasped* to upright supports.

Pellegrin, Fr. No. 323,457 of 1902 (381) Fig. 3 discloses a column surrounded by spiral wiring upon numerous longitudinal rods.

Kieserling & Moeller, Gr. No. 73,004, 1892, Figs. 7a b c (395) discloses continuous spiral encirclements evenly spaced *in notched spacing members,* exactly the claimed construction of Vandenburgh except that the notches are not expressly shown as beaten down on so as to enclose the encircling rods. Thayer says as to this series of notches described by the patentee (393) "I would imagine that was *pounded down.*" "That would be the *natural* thing to do, that would be the *assumption* * * * yes" (172-3) as one of the "various possible embodiments" suggested by the patentees (391).

Mollins, Swiss, No. 29,781, 1903 (403) shows equally spaced encircling rods, independent of each other, and fastened to spacers by wiring or metal loops.

Cummings, the president and assignor of the defendant in the Pittsburgh Case, No. 764,883, 1904, (258) discloses both rectangular and circular equally spaced and supported bands surrounding the concrete. Various methods of retaining the bands in place are shown.

In his patent No. 882587 of June 5, 1906, application filed Jan. 6, 1905 (279) Cummings shows circular enclosing bands supported on spacers in "overlapping spurs" punched out of instead of cut into the spacers, and shows instead a clip attaching device in his patent No. 882,931 of 1906, application filed October 22, 1904 (171).

Armand Considere, a French Engineer, the father of scientific investigation of the flow of concrete and its tendency in a column to expand *outward* under *vertical* pressure, said in an article written in French and later translated and published in New York in 1903 that:

> "The good results of hooped concrete depend on the proper arrangement of the hooping. * * * Hoops of two completely different types may be used. One type consists of independent hoops, and the other of continuous helicoidal spirals made of wire or rods as long as possible. If independent hoops are employed, each one must be locked so strongly as not only not to open under the internal pressure of the compressed concrete, but also not to show any appreciable deformation in its connection. Practically it is impossible to connect the countless hoops which an important structure would contain. * * * These inconveniences are avoided by the use of long wires or rods bent into helicoidal spirals. * * * To give concrete a high ductility and to increase at the same time to a high degree its elastic limit and crushing as well as column resistance, the hooping must form close loops and have the least number of joints. These conditions lead to the use

of helicoidal spirals combined with longitudinal rods forming a continuous skeleton which resists efficiently the transverse swelling of the concrete.

"Hooped concrete, the same as concrete-steel generally will take many forms and have many applications which will determine the methods of its construction."

Extended excerpts from article by Considere are found on pages 411 *et seq.* of the record.

Considere did not deem it necesary to tell engineers and craftsmen so simple a thing as how to attach the spirals to the longitudinals. He properly said: "Hooped concrete, the same as concrete-steel generally, *will take many forms* and have many applications which will *determine* the *methods* of its construction" (416).

In an article by Cristophe published in Paris in 1902, he said, among other things:

"The reinforcements of the 'Sidero-cement' pipes (Figs. 634-35 and Figs. 638-39) is formed of small special double Tee sections, curved in spirals, and wired together at intersections with inside straight bars of similar cross section. * *

"The principal bars, situated on the outside, are independent circular hoops or spirals. These bars are wired together. *Or* the wiring may be omitted; the longitudinals then *carry* upon their exterior faces *notches* (appellant's kerfs) regularly spaced to receive the bases of the hoops" (420).

Marquess in the Engineering News of New York, 1904, (425) discusses a design for a reinforced concrete column "*without Patented* features" embodying the idea of equally spaced surrounding and containing bars held in position and supported by bending their ends to holes in the supporting spacers.

A continuous spiral around supporting longitudinals is disclosed in the cut marked "Hooped column in exchange story" in the Engineering News of March 8, 1906 (426).

In the Engineering News of June 15, 1905 (327) it is said:

> "In modern building construction much use is made of the reinforced concrete column. The types of reinforcing are usually easily reduced to one of two general classes—a hooping in the form of a continuous spiral, or a series of independent hoops or loops. Longitudinal bars or rods may be used with either class."

The witness Cummings, in the Pittsburgh case, testified to the actual use of this construction at Hampton, Virginia, in December, 1903, and at numerous other places thereafter in the year 1904 (Pittsburgh record E 14 *et seq.)*. The Pittsburgh record is not in the printed transcript, but is here as an exhibit (484).

The use of appellant's kerf, substantially as he used it, is disclosed in some of the column hooping constructions above referred to. Appellant himself was not relying upon the kerf as an invention. He said:

> "The coils, Fig. 4, are secured in the bar in *any desired manner—for instance*, has hereinafter described * * * As a *preferred* means of securing the coil to the bar, I have shown a series of kerfs 8 in one face of the bar inclined away from the center of the bar towards the opposite end thereof." (50 and 80).

The kerfs, as a means of securing one metallic member transversely to another were well known in the arts. See.

Testimony of Thayer (131).
Admission of appellant (174-5).

Randall, No. 349,603, 1886, (220).
Norwood, No. 571,575, 1896, (235).
Prescott & Bennett, No. 447,162, 1891, (233).
Carson, No. 278,222, 1883, (218).
Harmon, 380,627, 1888, (223).
Bond, No. 432,930, 1890, (238).
Johnson, No. 589,898, 1897, (238).
Miles, No. 429,935, 1890, (228).
McCaul, No. 657,827, 1900, (420).
Caldwell, No. 682,316, 1901, (243).
Salisch, 417,397, 1889, (226).

A pile or post is but a column. The patent to Eason No. 723,651, 1903, (246), shows a concrete post in which the concrete is held within circular bands spaced by spacers and held in kerfs therein, being the present claim of Vandenburgh in every respect except that there are separate parallel loops instead of oppositely inclined spirals.

APPENDIX "D."

If further authorities than *Berger vs. Trussed Concrete Steel Co.* are needed to negative invention, they may be found in this circuit in:

Huebner-Toledo Brew. Co. vs. Matthews Grav. Carrier Co., 253 Fed. (6 C. C. A.) 435, 446:

Adaptation and combination in the perfection of the old idea of a gravity carrier of *numerous* elements each old in *various* arts.

"It must, of course, be conceded that patentable novelty may exist in a combination of old elements; but here the combination claims in suit are lacking in the usual and essential tests of invention. No new function of elements or new method of operation is evolved, and the result achieved is exactly the same as the old one. The settled rule under such facts is that to adapt an old and familiar device to another structure equally old and well known is not to exercise the inventive faculty; it is to apply the skill of the mechanic. *Akron vs. ManhattanRailway Co.*, 132 U. S. 84, 88, 10 Sup. Ct. 24, 33 L. Ed 272; *Peters vs. Active Mfg. Co.*, 129 U. S. 530, 537, 9 Sup. Ct. 389, 32 L. Ed. 738; *Crescent Brewing Co. vs. Gottfried*, 128 U. S. 158, 169, 9 Sup. Ct. 83, 32 L. Ed. 390; *Penn. Railroad vs. Locomotive Truck Co.*, 110 U. S. 490, 494, 4 Sup. Ct. 220, 28 L. Ed. 222; *Weir Frog Co. vs. Porter*, 206 Fed. 670, 676, 124 C. C. A. 470 (C. C. A. 6); *Frederick R. Stearns & Co. vs. Russel*, 85 Fed. 218, 226, 29 C. C. A. 121 (C. C. A. 6); *Indiana Novelty Mfg. Co. vs. Crocker Chair Co.*, 103 Fed. 496, 502, 43 C. C. A. 287, (C. C. A. 7).

"It may further be *conceded that appellee's carriers are better* than the Alvey carriers or any others of the prior art; this, too, is unavailing. It is met by the old rule that a mere carrying forward of the original idea, a change in form, an improvement in degree, without substantial change in either means or result, is not invention. *Railroad Supply Co. vs. Elyria Iron Co.*, 244 U. S. 285, 292, 37 Sup.

Ct. 502, 61 L. Ed. 1136; *Wagner vs. Meccano Limited,* 246 Fed. 603, 608, 158 C. C. A. 573 (C. C. A. 6), and citations. Superiority is not enough. *Grinnell Washing Machine Co. vs. Johnson Co.,* 247 U. S. 426, 38 Sup Ct. 547, 62 L. Ed. 1196. It can scarcely be doubted that the defects if any in the Alvey structures might have been remedied by the skilled mechanic. *Keene vs. New Idea Spreader Co.,* 231 Fed. 701, 710, 145 C. C. A. 589 (C. C. A. 6). This derives emphasis from the changes made in appellee's carrier, as we have pointed them out in the exhibit produced in court.

"It is said that appellee's carrier is not anticipated by any *single* patent; but it is not necessary to show complete anticipation in a single patent. The selection and putting together of the *most desirable* parts of *different* machines in the same or kindred art, making a new machine, but in which each part operates in the same way as it operated before and effects the same result, cannot be invention; such combinations are in the nature of things the evolutions of the mechanic's aptitude rather than the creations of the inventor's faculty. *Thompson vs. Boisselier,* 114 U. S. 1, 11, 5 Sup. Ct. 1042, 29 L. Ed. 76; *Luten vs. Whittier,* 251 Fed. 590,—C. C. A.—, decided by this Court May 7, 1918; *Elite Mfg. Co. vs. Ashland Mfg. Co.,* 235 Fed. 893, 895, 149 C. C. A. 205 (C. C. A. 6); *Kelley vs. Clow,* 89 Fed. 297, 303, 32 C. C. A. 205 (C. C. A. 7); *Keene vs New Idea Spreader Co., supra,* 231 Fed. at pages 708, 709, 145 C. C. A. 589."

Luten vs. Whittier, 251 F. 590;

Adaptation of the principle of retaining wall reinforcement to a "metal concrete arch bridge (substituting the retaining wall of the one for the spandrel wall of the other and the base of the retaining wall for the arch)."

Windsor vs. Mercier, 253 F. 448;

The use in highway vehicles of a dumping body similar to those previously used by railway carriages, although involving "reinforcements and improvements."

Edwards vs. Dayton Mfg. Co., 257 Fed. 980;

A new and useful combination in windows of various old tightening devices.

> "Upon careful consideration of the prior art, and giving due weight to the well-established utility of plaintiff's device and its highly favorable commercial reception, we are unable to find in it room for invention. The most which, to our minds, can be said is that the inventor has, in the exercise of a high degree of mechanical skill, selected and put together the most desirable parts of different devices in the same art, making a new structure, *doubtless better than any which preceded it,* but in which each part operates in substantially the same way as it did in the old and effects substantially the same result. This is not invention." (p. 984).

VanDorn Iron Works vs. Mathes Bros. Co. 260 F. 400;

Combination in mail receiving boxes, according to a new plan, of devices found in one or more other mail receiving boxes for the purpose of performing the same function.

> "Plainly, then, at the time the patent in suit was applied for, the *idea, if not the practice,* of uniting package and letter receptacles with suitable appliances in a single inclosure, and so as to render them accessible on one side or another, and indeed, wholly in front, for depositing and removing the mail, was old. It is true that the receptacles varied in form, location and dimensions, and that the openings for depositing and removing the two classes of

mail likewise varied in these respects, and also in means of protection against theft and effects of weather; and yet, as applied to the patented structure, these variations were negligible, since, in the sense of equivalency, the essential parts of that structure were old, and they severally operate here in the same way as they operated before, and effect the same result." (405)

It is only where there is the *additional circumstances,* bearing on invention as a question of fact, that there has been long unfulfilled an urgent demand and such new combination of old elements for a particular purpose has immediately received the commendation of wide commercial adaptation and use and the taking of licenses in recognition by the public of utility and patentability (not, as in the instant case, where neither the public, the Patent Office nor even the inventor recognized the invention as such), that the courts will turn the balance of the scale in favor of inventive patentability.

Concrete Appliance Co. vs. Meinke, 262 F. 985.

Note the distinction of the court in respect to patentability as between one patent on page 960 and the other on 965.

The rule is the same in other circuits:

Imperial Brass Mfg. Co. vs. Nelson, 203 Fed., (7 C. C. A.) 484, 489:

"*Packing for valve stems*" applied to " a *union* or coupling for firmly connecting the ends of *pipes or rods* to each other."

Stillwell vs. McPherson, 207 Fed. (D. C. N. D. N. Y.) 837, 844 *et seq.*:

Corrugated metal culverts; commercial success, but not invention. A most excellent illustration and discussion of *natural progressive development* in the arts.

Toledo Computing Scale Co. vs. Computing Scale Co., 208 Fed. (7 C. C. A.) 410, 414:

Adapting "back indication" from cash registers to computing scales.

Fischer vs. Automobile Supply Mfg. Co., 209 Fed., (2 C. C. A.) 225:

A hollow flexible power transmitting *shaft* in view of old hollow flexible *tubes.*

Peters vs. Chicago Biscuit Co., 215 Fed., (7 C. C. A.) 724, 726:

Adapting the idea of folded paper for "baskets or pails" to a completely enclosing "carton."

Hansen vs. Stick, 216 Fed. (D. C. W. D. Pa.) 164, 169:

Adapting the method of renewing worn "reamers" to worn "car wheels," the heating and then "expanding" the reduced size to the original required size by rolling or forging, in a similar manner.

H. K. Porter Co. vs. Baldwin Loco. Wks., 219 Fed. (D. C. E. D. Pa.) 226, 232:

Application in the production of *power* of a principle of change in temperature and volume of air in course of transmission therefore disclosed in the art of *refrigeration.* "In one case the atmospheric air *absorbs* heat from the substance within the tubes, and in the other case it *imparts* heat *to* the tubes and the substance therein."

Brown Portable Elevator Co. vs. Interior Warehouse Co., 234 Fed. (D. C. Ore.) 640, 652:

Adding an easily conceivable extension device to the design of a hay stacker, to elevate *fixed sized* boxes in a warehouse instead of *loose hay* in the field.

Quoting the *leading case* of

Mast, Foos & Co. vs. Stover Mfg. Co., 177 U. S. 485, 20 Sup. Ct. 708.

and numerous other illustrative precedents.

Watson Fireproof W. Co. vs. Biersach & Niedermeyer Co., 236 Fed. (7 C. C. A.) 346, 352:

Adaptation of glazing of windows of method of inserting wooden panels in storm doors.

Fetzer vs. Dempster Mill Mfg. Co., 238 Fed. (8 C. C. A.) 238:

Adaptation to press drills of the old "tongue truck" of harvesters.

APPENDIX "E."

The Plaintiff Appellant Has Surrendered His Original Patent, and the Reissue Patent is Utterly Void as to all its Claims. Therefore the Plaintiff Appellant Has no Patent to Consider.

As the *precise* proposition presented has not, as far as noted by the writer, been presented to the Supreme Court of the United States and as the holding of the Court of Appeals of the Seventh Circuit is directly contrary to the asumption of the Court of Appeals in the Second Circuit in the *New York* case that the claims of the original patent repeated in the reissue are valid, we take the liberty of endeavoring to somewhat illuminate the cases hereinafter cited by an *ex cathedra* analysis of the statute authorizing reissues.

The unquestioned purpose of the reissue statute (R. S. 4916) is to enable an inventor to obtain the full benefits of his invention as originally applied for where through innocent inadventence and mistake he has failed to originally secure what he was entitled to upon the substantial disclosures originally made.

He is not entitled to what he may have voluntarily abandoned where such abandonment is express or necessarily inferred by intendment of law.

He is not to secure the benefit of some other additional or different invention. That must be sought by a new and independent application.

To secure a reissue, within the spirit and purpose of this statute, and according to its letter and terms, certain essential jurisdictional conditions precedent must exist:

In the first place, the reissue must be for the "same invention." The inventor is only permitted to perfect his right under the original invention as it actually was.

In the second place, the inventor must have failed to originally perfect his actual rights through innocent and not fraudulent inadvertence and mistake. Whether the defect in securing originally the rights to which the inventor was entitled was due to "mistake" and innocent, and "without any fraudulent or deceptive intent" is a question of fact upon which the Commissioner's decision is final unless the record affirmatively discloses to the court that the Commissioner was wrong in this respect.

In the *third* place, the Commissioner's *jurisdictional authority* exists only

> "whenever any patent is *inoperative or invalid* by reason of (a) a defective or insufficient specification *or* (b) by reason of the patentee claiming as his own invention or discovery *more* than he had a right to claim as new."

It is the application of this particular provision of the statute upon which depends our contention that where the *original* claims are *repeated* in the reissue, together with new claims, and it appears that the *new* claims did not justify the reissue, there was *no jurisdiction* whatever for the reissue, and the reissue, *as a whole*, is invalid.

The jurisdiction only exists "whenever any patent is inoperative or invalid." This does not mean that it is "inoperative or invalid" as a whole but only that it must be "inoperative or invalid" to *some* extent, so that the inventor has not originally secured *all* that he was entitled to.

If the inoperativeness or invalidity of the patent, in whole or in part, is "by reason of a defective or insufficient specification" (the term "specification" includes the claims as well as the description), the inventor may

amend his claims without change in the description, if it is still for the "same invention" and the claims are supported by the description, even though he may *broaden* his claims in order to secure what he was originally entitled to, subject, however, to the limitation imposed by the court under equitable principles, and not by the statute, of estoppel against those who have established "intervening rights" prior more than the two year period allowed for the presentation of an original application, to the presentation of the application for reissue.

If the reissue is asked "by reason of the patentee (in his original patent) claiming as his own invention or discovery *more* than he had a right to claim as new," then the only privilege allowable is to *narrow* the claims to the point where they are supported by the disclosure of the description to the end that the inventor may not be defeated in his right to what he originally invented by having inadvertently claimed too broadly. This privilege of R. S. 4916 is but another method of protecting the inventor in the same way that he might protect himself by disclaimer under R. S. 4917.

Now, if the inventor's original patent was *not* "inoperative or invalid" for one of the two reasons above, he had no occasion to apply to the Patent Office for relief, and the statute does not grant to the Commissioner any authority to *reissue* the *same* patent as was originally issued. Unless there is *reason* for granting the inventor something *different*, there is *no authority* for granting him *anything at all*. If the Commissioner attempts to give to the inventor by reissue *only what he already had*, he is without authority, and gives the inventor nothing.

Of course, if the original patent is "inoperative and invalid" not necessarily as a whole, but as to some part

of it, so that the inventor is entitled to a reissue to correct his description, he may obtain a reissue with the corrected description and repeat his original claims. Equally of course, if the original description is correct, but the patent "inoperative and invalid," even though "inoperative and invalid" only as to part of the claims, the inventor may have a reissue patent upon the same description and renew all or part of his original claims *if* it is necessary to the protection of his rights to add *some* additional claims or change *some* of the original claims. In such event, *if* the conditions otherwise warrant, the old claims repeated are equally valid with the new claims or the changed claims included in the reissue. But if it develops that the discription remains unchanged and some of the claims remain unchanged, and it be determined that there existed *no* conditions authorizing the granting of the new or modified claims, then there was no occasion *whatever* for granting the re-issue, the jurisdiction fails, and the reissue is a nullity.

Consider the appellant's reissue with reference, for convenience, solely to claims 1, 2, 3 and 5. Claims 3 and 5 were identically the same as in the original patent. The description and disclosures was identically the same as in the original patent. The only change, except to add the new claims found to be invalid, was to correct a typographical error in original claim 3, repeated as claim 3 of the reissue, by changing "end" to "edge." This typograph error was immaterial and did not affect the force of the original patent (253 F. 143, 262 F. 96). The only jurisdiction to grant a reissue with claim 3 and 5 or any other claims in it, was the assumption that claims 1 and 2 of the original patent were part of a "defective or insufficient specification" which was attempted to be made effective and sufficient by reissue claims 1 and 2. There

is no pretense of a right to support the jurisdiction of the Commissioner to reissue on the ground that appellant had erred in his original patent by "claiming as his own invention or discovery *more* than he had a right to claim as new." Accordingly, when it appears that appellant's original claims 1 and 2 did not constitute a "defective or insufficient specification," *every* basis for the jurisdiction to reissue proves to have been nonexistent, and the Commissioner *had no authority to take any action whatever in the premises.*

As against the conclusion of the Court of Appeals in the Second Circuit, we cite two opinions in the Court of Appeals of the Seventh Circuit by Judge Baker, a Nestor of the Patent Bench, holding that when the jurisdictional ground for reissue is nonexistent, the reissue patent is "utterly void." These opinions, particularly the latter, are so full of meat and cogent argument that we do not attempt to excerpt from them. *We ask their full and detailed consideration by this Court.*

General Electric Co. vs. Richmond Street & I. Ry. Co., 84 Fed. 178.

McDowell vs. Ideal Concrete Machine Co., 187 Fed. 815.

After a careful effort to review all of the decided cases, we feel justified in stating that no court has even *said* that a reissue patent that contains nothing sustainable except what the patentee *already had* in his original patent was valid, except as a *dictum*, where the point was not fully considered because not necessary to the decision of the case, the decision necessarily resulting from some other factor involved.

There are only two opinions of the Supreme Court of the United States which, even by expression, seem to

lend support to the theory that although a reissue patent may be invalid as to everything *new* therein, nevertheless it may be held valid as to the *old* matter repeated from the original surrendered patent. In neither of these cases were such expressions *necessary* to the decision, because, in each case, the *validity* of the *old claims repeated* was not in issue, the old claims not being infringed in either case.

In *Mahn vs. Harwood*, 112 U. S. 354, controlling opinion 5 S. C. R., 174, dissenting opinion 6 S. C. R., 451, the majority opinion held that a reissue patent was invalid if the Commissioner "exceeded his authority in granting" it. In arguing the question of jurisdiction or authority upon the part of the Commissioner, the court *illustrates* such lack of authority by reference to the terms of the statute excluding a reissue for "a different invention," and says "it is no doubt a *general rule* that where the commissioner has *exceeded his authority* in granting or reissuing a patent, such fact furnishes a good defence to a suit brought for its infringement." The particular excess of authority which was the *point of decision* in the Mahn case was that the commissioner had granted the reissue after an unreasonable lapse of time, in that case, four years. For this reason, the court refused to enforce the patent as to the *new* claims 1, 2 and 3. The fourth claim was substantially the same as in the original patent. But the court concludes:

> "As this leaves only the fouth claim to be considered, and as it is clear from the evidence in the case that the appellant did *not infringe* that claim, the decree of the Circuit Court must be affirmed."

From the foregoing it is clear that the point of *decision* went only to the question of the new claims upon reissue. It is true that the court, referring to lack

of jurisdiction for reissue, uses the expression, "the patent will be considered as void to the *extent of* such illegality" but this was a mere *dictum*, as the court was not called upon to *decide* whether the reissue *as a whole* was void.

So, in the case of *Gage vs. Herring*, cited by the Court of Appeals for the Second Circuit as supporting the statement, "the fact that claims 1 and 2 of the reissue are invalid, as too broad, does not invalidate claims 3 and 5," the question of the validity of the patent as a whole and the enforceability of the old claims was ***not involved.*** In *Gage vs. Herring* the court said:

> "The new claim in the reissue being invalid, and the defendants *not having infringed* the entire combination set forth in the *repetition of the old claims*, the decree below can neither be upheld upon the new claim, nor modified so as to apply to the other claim, but must be reversed and the case remanded, with directions to dismiss the bill."

The value of *dicta* is well stated by the Court of Appeals of the Eighth Circuit in a case in which it rendered a decision contrary to a *dictum* of the Supreme Court of the United States *four times repeated* in different decisions.

> "Those statements are not authoritative in this case because the authority of general expressions and broad statements in the opinions of courts is always limited to the specific questions which they were considering and deciding when they were used. *Cohens vs. Virginia*, 6 Wheat. 264, 339,"

and many other cases cited.

King vs. Pomeroy, 121 Fed. 287, 294.

The Court of Appeals of this Circuit, referring to expressions found in cases concerning invalidity of a reissue made for the mere purpose of broadening the claim, expressed the same opinion:

"Some of them do contain language to this seeming effect, yet we think in each the rule will be found sufficiently controlled by *laches*, intervening rights, rewritten or altered description or drawing or other clearly distinguishing fact."

American Automotoneer Co. vs. Porter, 232 Fed. 456, 461.

On the contrary, in other cases, and in the very latest expression of the Supreme Court of the United States on the subject, it is clearly indicated as the opinion of the court that the reissue is void as a whole. The court quotes earlier expressions under earlier statutes directly to that effect, and in the same connection cites *Gage vs. Herring*. It is apparent that the court itself, in its latest expression, (*Ebey vs. King, infra*) did *not* see in *Gage vs. Herring* any such decision as is found therein by the Court of Appeals of the Second Circuit. We quote the syllabi discussing the point *decided*:

"(1) A patent surrendered for reissue is cancelled in law, as well when the reissue is denied as when it is granted.

(2) Since the surrender of the patent in this case, a new clause in the patent law, declaring that the surrender 'shall take effect upon the issue of the amended patent,' is retained in Section 4916 of the Revised Statutes. What may be the effect of this provision in cases where a reissue is refused, this court does not *now* decide. *Peck vs. Collins*, 103 U. S. 660."

We quote from the opinion itself expressions on the instant question:

"Had the plaintiff, in his reissue, confined himself to the correction of an error so manifest, we should have found little difficulty in sustaining it; but in his application, which was made four years

after the original patent, he makes no claim that his patent 'was inoperative or invalid by reason of a defective or insufficient specification,' or by reason of his having claimed 'more than he had a right to claim as new,' or that any error had arisen 'by inadvertence, accident, or mistake' *without which the commissioner has no right to grant a reissue,* but simply prays that he may be allowed to surrender his original patent, and that 'letters patent may be reissued to him for the same invention, upon the annexed amended specification.' He makes no reference at all to the obvious mistake in his first claim, and, although the point is not distinctly made in the briefs, we think it a serious question whether the commissioner of patents had any jurisdiction under Rev. St. Sec. 4916, to consider the application upon the bare statement that the patentee desired to surrender his patent and obtain a reissue. The commissioner is authorized to reissue patents in certain specified cases, and, if the petition makes no pretense of setting forth facts entitling the patentee to a reissue, it is exceedingly doubtful whether he obtains any jurisdiction to act at all.

* * * * * * *

"Under the rulings of this Court, it is clear that this reissue *cannot be supported.* Not only was there *no claim of a defective or insufficient specification,* none that the patentee had claimed as his own invention *more than he had a right to claim as new,* none of inadvertence, accident, or mistake, but, four years after the original patent was issued, the patentee attempts to secure a reissue, with claims broadened for the purpose of covering that which is presumed to have been once abandoned to the public. *All that has ever been said by this Court in restraint of the practice of reissuing patents applies with full force to this case. White vs. Dunbar,* 119 U. S. 47, 7 Sup. Ct. 72; *Ives vs. Sargent,* 119 U. S. 652, 7 Sup. Ct. 436; *Dunham vs. Manufacturing Co.,* 154 U. S. 103, 14 Sup. Ct. 986.

"*A further question* arises whether, where a patent has been surrendered and reissued, and such reissue is held to be void, the patentee may proceed upon his original patent; *in other words, whether the surrender is good, though the reissue be void.* As the law stood until 1870, it was held in *Miffit vs. Garr,* 1 Black, 273, that the surrender of a patent under the act of 1836 was a legal cancellation of it; that no right could afterwards be asserted upon it; and even that suits pending for an infringement of such patent fell with surrender, because the foundation upon which they were commenced no longer existed. See also, *Reedy vs. Scott,* 23 Wall. 352, 364.

"By the act of July 8, 1870 (Rev. St. Sec. 4916) it was declared that the surrender shall take effect upon the issue of the amended patent; but it was intimated in *Peck vs. Collins,* 103 U. S. 660, that the effect of an adverse decision on the title of a patentee to the invention would be *as fatal* to the *original* letters as to his *right to a reissue.* In delivering the opinion of the court, Mr. Justice Bradley observed that 'since the decision of this case *(Moffit vs. Garr)* it has been uniformly held that, if a reissue is granted, the patentee has no rights *except such as grow out of the reissued patent.* He has *none under the original.* That is *extinguished* * * *. No damages can be recovered for any acts of infringement committed prior to the reissue * * *. It seems to us equally clear that, as the law stood when that decision was made, * * * a patent surrendered for reissue was canceled in law as well when the application was rejected as when it was granted. The patentee was in the same situation as he would have been if his original application for a patent had been rejected. * * * Surrender of the patent was an abandonment of it, and the applicant for reissue *took upon himself the risk* of getting a reissue, or *of losing all. A failure upon the merits,* in a *contest with other claimants,* only gave *additional force* to the *legal effect* of the surrender.'

In *McMurray vs. Mallory*, 111 U. S. 97, 4 Sup. Ct. 375, it was held that the patentee who had surrendered his patent, and taken reissued letters on a new specification and for new claims, *could not abandon the reissue and resume the original patent by a disclaimer.* 'This,' said Mr. Justice Woods, 'could be done only, if it could be done at all, by surrender of the reissued patent, and the grant of another reissue.' See also, *Gage vs. Herring*, 107 U. S. 640, 2 Sup. Ct. 819."

Eby vs. King, 158 U. S. 366, 15 Sup. Ct. 972.

It should be observed that in this *later* decision of the Supreme Court of the United States, it saw nothing in *Gage vs. Herring* inconsistent with the foregoing opinions as later expressed.

There is a moral feature involved in this question which should not be lost to view. It is aptly illustrated in the case of appellant's patent. A claimed inventor, at his peril, demands and secures even in his *original* patent broader claims than he is entitled to. He may remedy *this* by disclaimer. If he insists on *more* than he can rightfully sustain, he fails altogether. He is not allowed to fall back on what he *might* have properly secured. Likewise, a patentee may, as appellant *did*, conceive, from the development of an art subsequent to the issuance of his patent and during a period when he has lain quiescent and done nothing to commercialize his claimed invention, that *a valuable field has been opened* up which he *should have* anticipated and monopolized, and that he may, through a reissue, yet be sucessful in monopolizing. He presents his application for reissue to the Patent Office without anyone but the officials of that office to say him nay. It is an *ex parte* application. He is *gambling* for a prize. The *stake* required of him by the statute is the *surrender of his original* patent. He surrenders it in the

hope of grasping more than he originally had. His aims are selfish and to the detriment of those who have developed the art in the interim. He secures his reissue patent. He brings suit upon it. He puts the defendant to the risk of an adverse decision and an acounting of profits to the earning of which the plaintiff has contributed nothing. He puts the defendant to the expense of the defense in this case. It is finally determined that he had no valid ground for claiming anything more than *he originally had*. He has surrendered what he originally had. He has procured the action of the Patent Office without occasion for such action and on the faith of a surrender of the original patent and *his own* assertion that the original patent was ineffective to protect his claimed rights. *Why should he still be left to enjoy all of the benefits of the surrendered patent?*

ADDITIONAL SUGGESTIONS.

At the bottom of page 1 and the top of page 2 of petitioner's brief, the alleged invention of petitioner is referred to as "a coil of wire with longitudinal *spacing* or *reinforcing* bars having integral spurs for holding the coils *in place.*"

Applied to the use of the product known as "column hooping" for reinforced concrete columns, this statement is directly contradictory to the testimony of petitioner's witness Thayer, who explains that in column hooping (as distinguished from *bars,* with or without *auxiliary* members, whether straight or in loops), the longitudinals (which in *beams* are used for and calculated as *reinforcement*), are mere *spacers* which serve no purpose except to hold the coils of the spiral *in place* so that they will remain evenly disposed in parallel relation to each other until after the concrete has been poured, tamped, and set, whereupon the concrete itself is a sufficient "spacer," and the original longitudinal spacer ceases to function—*ceases to be* "reinforcement." Thayer says that in column hooping these small spacers would not give "any substantial calculable results in a column." "It would not amount to very much. It would be small. It would not be worth figuring. * * * It might really be a detriment. They would serve *no substantial function* except as a spacer for the spirals." (Transcp. 139.)

It is for this reason that designers of column hooping use as *small* a spacing bar as will suffice for the temporary purpose of maintaining the spacing. (Thayer-Transcp. 89.)

See cuts of various column hooping construction (211), appellee's construction being Exhibit 2. Exhibit 1 is a model prepared by appellant.

"ART" AND "INVENTION."

Counsel for respondent-defendant conceives it to be an advantage that he first came to the consideration of the patent law after nearly forty years of general practice, and conceives the patent law not to be the abstruse specialty its practitioners regard it. It seems to embrace nothing but the application of general legal principles to the construction of a statute, intended to form the basis of a contract between the Government on behalf of the people at large and an inventor, to exchange the privilege of temporary monopoly for the gift of a material advancement in the arts, regulated in practice by the application of the principles of the chancery courts in which it is administered, such as laches and estoppel, by judges applying broad legal principles; beyond which lie only the questions of fact as to novelty and invention.

In the development of the patent law by its specializing practitioners the use of sonorous phrases and general terms has developed to the point of giving greater sanctity to the terms than the principles involved in the cases where the courts first began to use them. Directly, we have involved such terms as "art" and "analogous art" as applied to the question of fact involved in determination of "invention."

It seems worth while, occasionally, to come back to the fundamental principles. If an architect desires a frame structure with a roof, he may provide, in the roof, for rafters, sheathing, and shingles. He wants the rafters firmly attached to constitute a frame work. He wants the sheathing firmly attached to the rafters to support the shingles. And he wants the shingles firmly fastened to the sheathing in proper relation to produce a watershed. But he does not care, so long as the respective parts so designed are firmly attached to each other, whether the carpenter who does the job bolts the rafters

together, or screws them together, or adequately mortises them, or nails them with wrought iron nails, or steel cut nails, or wire nails, or uses many nails of a smaller size or fewer nails of a larger size, or what choice the carpenter uses in his method of attaching the sheathing to the rafters; or whether the shingles are nailed with one kind of nail or another, or many small nails, or few larger ones, or whether the nails are driven in straight, or driven in diagonally, or what method the carpenter uses as long as he accomplishes the architect's purpose of firmly attaching the various elements of construction one after the other to the other. The "art" of the architect is one thing to design what he wants: the "art" of the carpenter is another to execute that design in *any* sufficient manner.

But, in the Patent Office, and in the courts, the alleged inventor who seeks to escape the effect of the law as laid down in Atlantic Works vs. Brady, 107 U. S. 192-205, and seizes as an invention upon any natural and ordinary method of adaptation, sounds to the four corners of the earth the theory of a "new combination."

Applied to the case at bar, the designing engineer who is laying-out a reinforced concrete structure, columns, beams, floors, stairways, and what not, takes his knowledge in the "art" of the engineer to calculate what stresses in compression a given quantity of a given mixture of concrete, arranged in a given form, will stand, and what tensional stresses a given amount of steel, located in a given place in the concrete, and straight, curved, diagonal, or otherwise arranged, will furnish, and what combination of these combined materials will meet the required stresses of the loads that are intended or expected upon the various parts of the structure he is designing. Thereupon, the engineer, in his "art" completes his design showing quantities, shape and location of the two speci-

fied materials. Thereupon, the engineer applies to the metal worker in the "art" of the latter, to prepare him the metallic elements conforming to his design. If only straight rods are to be used, they are purchased from the mill in required sectional areas and cut to required lengths. If they are to be bent, the metal worker bends them. If the engineer prepares his design so as to require stirrups running at right angles from longitudinal metal members, the metal worker prepares the stirrups and provides means for attaching them to the longitudinal rods or bars. If the engineer's design calls for diagonal members, either straight or curved in loops, attached to the main longitudinals, the metal worker prepares them and attaches them in some proper manner. The method of attachment is one of the known greatest economy that will furnish sufficient attachment. The auxiliary members may be made by striking them up from integral fins upon the longitudinal or by riveting them, or tieing them around, or running them through holes with bolts to hold them in place, or any other manner that will accomplish the purpose. The construction of the structure designed by the engineer is the "art" of the metal worker. Then the carpenter comes in with his "art." He builds forms in which the design of the engineer constructed by the metal worker may be placed and held while the fluid concrete is poured in and set. And finally comes the "art" of the concrete mixer, pourer, and tamper, who mixes the concrete in the proportions and kinds of cement, sand, or rock or gravel, specified by the engineer as producing a concrete with the compressive resistance required by his design, and pours or tamps it around the metal structure placed in the carpenter's forms, and leaves it there to set. And finally, the "art" of the carpenter comes back and removes the form, and the structure is built.

In the construction of reinforced concrete columns

engineers had long known and disclosed that a desirable reinforcement against the tendency of a column to spread or spawl laterally under vertical pressure, could be best resisted by encircling metallic bands either individual or consisting of a continuous coil so closely placed that it amounted to practically a series of horizontal parallel bands, and that it was necessary in putting these into the carpenter's molds and keeping them in place while the concrete was poured and tamped, that the coils should be temporarily held in place by some sort of spacer against displacement during the pouring and tamping of the concrete until the concrete set and the spacer ceased to function. Whether the coils should be riveted to the spacer, wired to the spacer, set in either diagonal or rectangular notches in the spacer; whether they should be held in the spacer rigidly, involving bulk in shipment, or could be held loosely in the spacer so as to collapse in shipment and still be held sufficiently in place during the pouring and tamping of the concrete, were all problems for the "art" of the metal worker, and not the "art" of concrete reinforcement in the sense of the "art" of the designing engineer. The engineer didn't care how it was done as long as it was done. The metal worker was free to adopt what seemed the best expedient known to his "art." Scores of ways of accomplishing this purpose in handling a metal structure were known, as was also known the general principle of column hooping, long before Vandenburgh. Each the diagonal kerf with the overlapping spur and the rectangular notch with the peened edges were among them. The record shows it. Petitioner's witness Thayer testified to it. Petitioner's counsel admits it on the record. The metal worker needed no instruction from Vandenburgh in accomplishing this purpose. This would seem to dispose of the idea of invention, or of an alleged new "combination," or any question of whether the methods of affixing one

metal member to another were in one art, or in some "analogous" or "non-analogous" art.

We think the foregoing disposes of the quotation from the court below found on page 3 of petitioner's brief. Petitioner seems to think that everything the court decided against him was wrong and that everything the court below indicated or assumed in his favor was right, and is conclusively disposed of.

FORM OF PROOF.

On pages 5 and 6 of his brief, petitioner says that the testimony in the trial court should not be considered now because "printed publications offered in evidence were insufficiently proved." A sufficient answer to this, if any answer is necessary, is that this question was not raised by the errors assigned in the Court of Appeals (Transcp. 479); and this court is acting as a court of review. If there was any such error, it has been waived.

ACTION IN THE PATENT OFFICE.

On page 6 of petitioner's brief he says that "The art shows the invention to be a pioneer patent in its limited field, a cloud of patents on the same subject-matter following closely after Vandenburgh."

We have referred in our brief below (*supra,* 41 *et seq.*) to the remarkable fact that if this was a patent on column hooping at all its disclosure was not sufficient to suggest to any of those who have used "thousands of tons" (Petitioner's Brief, 10) of this material that they apply to petitioner for the privilege of using it, or suggest to the Examiner who issued petitioner's patent, and thereafter issued a "cloud of patents" on column hooping, some of which were co-pending with each Vandenburgh's original patent and his re-issue, that the patent of petitioner was some reason why the other patents

should have been put into interference or refused. Petitioner's witness Thayer says that, assuming petitioner's contention as to his invention being correct, the subsequent patents necessarily cover the same invention and should have been put in interference or rejected on account of previous patent (Transcp. 185-186-188-189). It is passing strange that the Examiner could not see this.

REINFORCING.

On page 10 of his brief, petitioner says that the "fact that defendant uses a *small* bar in no way changes its character as *reinforcing,*" but petitioner's witness Thayer says that structures of the character of defendant's did not use the "*small* bar * * * as *reinforcing*" at all. See testimony of Thayer hereinbefore referred to as to the spacer serving "no substantial function except as a spacer." (Transcript 139, 189, 211.)

IMPRESS ON THE ARTS.

Petitioner reiterates, *i. e.*, brief, page 14, that his invention substantially displaced all other forms of columnar reinforcement. The testimony shows the development of the art in apparently entire ignorance of plaintiff. Whether plaintiff invented what he now claims or not the rest of the world never found it out. It simply went on under the principle in Atlantic Works v. Brady, doing the obvious thing when the cheapening of cement, knowledge of reinforced concrete, engineering generally, the availability of the required kinds of steel, and the demand for fire proof construction, called for its use.

KIESERLING PATENT.

On page 20 of petitioner's brief he refers to this patent which, entirely aside from any question of invention, is cited by us as a complete anticipation (*supra*

22). Petitioner asserts on page 20 of brief that in Kieserling's patent the "spirals were set in notches but no holding means of any kind was shown. *Undoubtedly wires were used* at that time to hold the spirals in place." As we have pointed out (*supra* 22), Kieserling provided for a structure where the diagonals must, to be effective, be held in place "in both directions," and shows one means of accomplishing that in his figure 7b, and while the drawing does not show directly, nor the Kieserling specification state, how the coils in figure 7c were held in the notches, petitioner's witness Thayer does not agree with the writer of petitioner's brief that "undoubtedly wires were used," but says that at that time "peening down the adjacent metal so as to create a projection in the process of peening, * * * was well known in the metal working art" and directly of Kieserling:

> "A. He does not show any pounding down, but I imagine that was pounded down.
> "Q. That would be the natural thing to do. That would be the assumption. * * *
> "A. Yes." (171-172.)

INFRINGEMENT.

Petitioner's argument on the subject of infringement by the defendant (brief 22) in this case appears to put the petitioner upon the horns of a dilemma, not referred to in our brief in the court below. This defendant uses a rectangular notch with peening on each side. If petitioner's claims cover this construction, then they were invalid because anticipated; if, to uphold the patent, it may be held that the broad claims of petitioner are limited so as to exclude this anticipating device, then defendant does not infringe.

PRE-DATING TESTIMONY.

On account of the date of the references, the date of petitioner's conception is not particularly material. However, the testimony referrd to in petitioner's brief (p. 25), as on page 101, does not show any preconception of the device of the patent, whatever that may be. The witness Blethyn says that he recognizes the drawings in the Vandenburgh patent. He says that he made a "test of the Vandenburgh *reinforcing.*" But *which?* The drawings show a number of kinds.

In the trial court, witness Blethyn produced a sample which consisted of a section of a bar about three feet long, three inches wide, and a quarter of an inch thick, with some notches cut in the edge. The notches were wide enough to accommodate a coil about one-eighth to three-sixteenths of an inch in diameter, as the writer recollects. In any event, the bar produced had a score or so times the sectional area of the coil which it was intended to hold. That bar should be before this court as a physical exhibit. That it had nothing to do with a structure to be used for column hooping is demonstrated by the testimony of petitioner's witness Thayer that while in beam construction the *longitudinal* is the *main* thing and the *diagonals* are *auxiliary,* in column hooping the *sole figured reinforcement* is the encircling coil, and the longitudinal is merely a spacer for temporary use and disregarded in the calculations. A longitudinal bar *twenty to forty times the sectional area* of the coil would not meet anybody's idea of the mere *spacer* for column hooping.

Where time of invention or reduction to practice, whether relating to an alleged anticipating use or to an effort of a patentee to pre-date his application date, the proof must be "beyond a reasonable doubt." Drum v. Turner (8 C. C. A.) 219 Fed. 188, 198 and cases cited. 38 Century Digest, Patents, Secs. 121-123.

RIGIDITY.

On page 32 of his brief, petitioner is still contesting the proposition that his original structure provides for coils held rigidly in place, despite the finding of every court that has passed on the question that such was petitioner's original intention. That intention was not dependent upon the manner in which the coil was held under the overlapping spur of the patent, but upon the fact that the patent provided for a construction which would develop "truss" action; *and it would be absolutely impossible to develop truss action unless there was such rigidity in the arrangement.*

The word "truss" is familiar in engineering. The Pratt truss and the Howe truss of bridges are familiar to our boyhood days. Try and imagine a bridge across a stream with the truss members bendably attached to each other by hinges at the point of connection.

Respectfully submitted,

W. F. GUTHRIE,
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Youngston, Ohio.

VANDENBURGH *v.* TRUSCON STEEL COMPANY.

CERTIORARI TO THE CIRCUIT COURT OF APPEALS FOR THE SIXTH CIRCUIT.

No. 273. Argued January 17, 1923.—Decided February 19, 1923.

1. A patent cannot be extended by reissue to a field beyond its original intention. P. 14. *Miller* v. *Brass Co.*, 104 U. S. 350.
2. Patent No. 841,741, to Vandenburgh, for a bar, to be used in reinforcing concrete construction, provided on one side with a series of kerfs, each with an integral overlapping spur, and a spiral coil disposed in the kerfs and retained beneath the spurs, is not infringed by a collapsible construction consisting of a spiral loosely engaging two spacer bars. P. 14.
3. The method of attaching a metal spiral to a metal rod by kerfs, was anticipated in metal working and in reinforcing concrete, and

adding a spur or clamp, or hammering the kerf edges, to fix the rod, involved no invention P. 15.
277 Fed. 345, affirmed.

This was a bill in equity by Vandenburgh praying an injunction and accounting for the infringement of a patent granted him January 22, 1907, No. 841,741, and reissued to him August 15, 1916. Reissue No. 14,182. The patent is for a reinforcing bar to be used in concrete construction.

The patent since reissue has been the subject of litigation in the second, third and sixth circuits. In all the circuits, the first and second claims of the reissue have been held void because too broad and because secured nine years after the original issue for the purpose of covering intervening devices. In the second circuit, Judge Hough, sitting on the District Court, found that claim 3 must be so narrowly construed that defendant's device did not infringe. The Circuit Court of Appeals sustained the third claim and found infringement, reversing the District Court's decree, and sent the case back for assessment of profits which have been found to be about $15,000.00.

In the third circuit, Judge Orr found claim No. 3 invalid for lack of invention. The Circuit Court of Appeals sustained the decree of dismissal by the District Court, but on the ground of non-infringement.

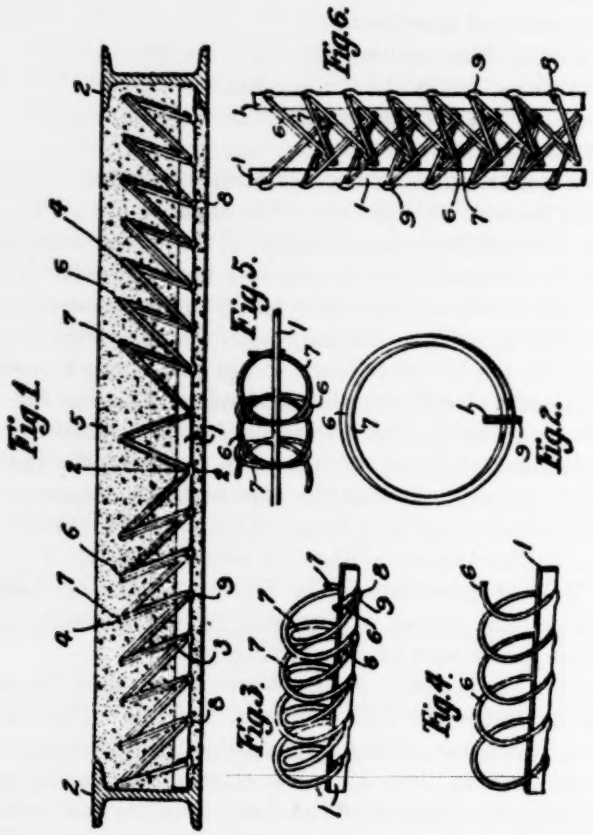
In the sixth circuit Judge Westenhaver took the same view as Judge Orr and dismissed the bill. The Circuit Court of Appeals affirmed the action of the District Court on the ground that, if valid, claim No. 3 must be so narrowly construed that the defendant did not infringe.

The drawings accompanying the specifications of the patent are the same in the reissue and appear on the page following.

The specifications say:

"The invention has for an object to provide a reinforcing-bar with one or more spirally-disposed coils secured to

the bar so as to provide an extended area of contact adapted to resist strain longitudinally and laterally of the bar and to form a truss within the body of concrete or



other plaster material which provides the maximum of supporting strength in the arch or surface to be formed.

"Other and further objects and advantages of the invention will be hereinafter set forth, and the novel features thereof defined by the appended claims.

"In the drawings, Figure 1 is a vertical section showing the bar applied to supporting girders or beams. Figure 2 is an enlarged vertical section on the line 2—2, Fig. 1. Fig. 3 is a detailed perspective of the primary and secondary coils shown in Fig. 1. Fig. 4 is a similar view of a modified form using one coil. Fig. 5 is a detailed plan of the form shown in Fig. 3, and Fig. 6 is an elevation of two meshing coils used for girder and column construction.

* * * * *

"The bar may be provided with a primary coil 6, extending in one direction, as shown in Fig. 4, which is sufficient in light construction; but when a heavier construction is to be used a secondary coil 7 is provided, which extends in the opposite direction to the coil 6 and through the same so as to cross beneath the coil 6 at a point directly above the bar, thus providing a construction in which all lateral pull or strain of the coil is avoided, owing to the equalization thereof by the oppositely-extending coils and the tendency of the coils to move or flatten toward the face of the bar resisted. This preferred construction is shown in Figs. 1 and 3, and it is also desirable that both of the coils be deflected away from the center of the bar, as shown in Fig. 1, as the greatest supporting strain carried by the arch is at the center thereof, and this deflection therefore resists such strain and tends to draw the coils upward into a position at right angles to the bar.

"As a preferred means of securing the coils to the bar I have shown a series of kerfs 8 in one face of the bar inclined away from the center of the bar toward the opposite ends thereof, and the coils are seated within these kerfs and held therein by means of the integral spurs 9, which are forced downward upon the coils when inserted and permanently retain them in position.

"In Fig. 6 a modified application of the invention is shown where two of the bars are disposed parallel to each other, with their coils intermeshing, for use in column or girder construction, wherein such a construction provides the maximum of strength with the minimum of weight in the reinforcing material.

"In the operation of the invention it will be seen that the bar supporting the coil resists any movement thereof longitudinally of the bar and provides the necessary strength upon which the truss structure formed by the coils is carried."

The first four claims of the original patent were as follows:

1. In a reinforcing bar, a spiral coil rigidly secured thereto at two points in each convolution thereof and extended beyond and free of said bar at the opposite side therefrom to the securing-point.

2. In a reinforcing-bar, a spiral coil rigidly secured thereto at two points in each convolution thereof and extended beyond and free of said bar at the opposite side therefrom to the securing-point, said coils being deflected in opposite directions from the center of the bar toward the ends thereof.

3. A reinforcing-bar provided upon one end with a series of kerfs each having an integral overlapping spur, and a coil disposed in said kerfs, each convolution thereof being retained beneath one of said spurs.

4. A reinforcing-bar provided upon one edge with a series of kerfs disposed diagonally to the length of the bar each having an overlapping integral spur projected toward the center of the bar, and a coil disposed in said kerfs and retained beneath said spurs.

The first and second claims of the reissued patent were as follows:

1. A concrete reinforcing consisting of a bar having a plurality of integral spurs, and a spiral coil permanently

secured thereto by having the spurs bent down on the several coils, the coils extending beyond and free of the bar at the opposite side therefrom to the securing point.

2. A concrete reinforcing consisting of a bar having integral means to secure a coil thereto, and a spiral coil permanently secured to the bar in each convolution and extended beyond and free of said bar at the opposite side therefrom to the securing point.

The third and fifth claims of the reissued patent were the same as the third and fourth of the original.

The defendant makes and sells a collapsible spiral, or cylindrical helix used in strengthening concrete columns or pillars. It consists of a cylindrical spiral of steel wire fitted to two T bars or spacers. Each convolution of the spiral engages the leg or outside edge of the T spacers at regular intervals. The engagement is loose fitting so that this construction which is normally stove pipe shaped can be made flat for shipment by moving the metal rods or spaces longitudinally in opposite directions. The method by which the spiral is attached to the spacer bar is a rectangular notch in the edge of the T bar, with one or both corners peened or hammered down so as to retain and loosely hold the spiral. This is said to infringe the claims of plaintiff's reissued patent Nos. 1 and 2 and also claims 3 and 5 which were in the reissue as in the original patent, except that in claim 3 the word end was changed to edge to correct an obvious error.

Mr. O. Ellery Edwards and *Mr. Carlos P. Griffin* for petitioner.

Mr. W. F. Guthrie, with whom *Mr. E. N. Pagelsen* was on the brief, for respondent.

Mr. Chief Justice Taft, after stating the case as above, delivered the opinion of the Court.

The expansion and improvement of the art of reinforcing concrete began several decades ago. There were two

different needs, one was for strengthening concrete beams and the other for strengthening concrete columns. The term reinforcing bar is usually applied in the art to a rod or bar used to reinforce a concrete beam against the tension longitudinal of the beam itself. The concrete itself has great power of resisting compression, but it has not tensile strength and its weakness manifests itself in cracking along the lower half of the beam. A steel bar placed below the middle of the beam furnishes the useful tensile resistance. But it was found that certain diagonal cracks developed in the beam toward the respective ends of the beam and it was sought to prevent these by minor auxiliary rods attached to the main reinforcing bar. This was the field which Vandenburgh entered and devised an arrangement, shown in Figure 1 of his drawings, of a reinforcing bar imbedded in the lower part of the beam with transverse loops or spirals, part on one side of the center of the bar and part on the other and fitted rigidly into the bar so that those on each side leaned at an angle away from the center and in an opposite inclination from those on the other. In strong construction, these spiral loops were doubled by a second spiral which meshed with the first. Now, as the specifications show, this arrangement of the bar and opposing spirals was to apply the truss principle to the strengthening of the beam and to give it the tensional resistance along the lower part of the beam and against the diagonal tensions near the ends of the beam. No one can read the specifications and examine the drawings without perceiving that this was the gist of the Vandenburgh invention. Reference is made to the use of the plan for column construction, but the only use of it for that purpose is shown in Figure 6, which discloses two upright reinforcing bars with their spirals meshing but connected in no other way.

The truss formation was not especially adapted to the needs and strains of the concrete column. The history of

that field in the art shows that one of the pioneers was a Frenchman named Considere, who some years before the plaintiff's patent had shown that the tendency of concrete in a column was to expand outwardly under the vertical pressure to which it was chiefly exposed and the best way of reinforcing columns was by pouring the liquid concrete into a hooping made of a series of independent hoops, or into a continuous helicoidal spiral or cylindrical helix of a steel wire or rod, of a stove pipe form. After him, column hooping became common in the art as the only practical method of column reinforcing and the convolutions of the spiral were spaced and supported by steel uprights with which they engaged in various ways. In one French patent, the convolutions were tied with steel wire to the spacers. It is the form of this engagement between the uprights and the spirals which is the crux of the present suit.

The preferred form of Vandenburgh for the engagement between his reinforcing bar and the spiral loops of his truss arrangement is by a kerf or cut in the edge of bar inclined away from its center in which the coil rod is placed and held therein by an integral spur forced downward upon the coil when inserted, which permanently retains it in position. The defendant has a rectangular cut in the edge of the T spacer or upright and retains the spiral rod in it by peening or hammering down the edges of the cut so as to keep the rod from slipping out, but leaving play enough to permit the collapsing of the spiral and shipment in its collapsed form. Others had adopted a similar form of engagement. Observing this, Vandenburgh who had not used or exploited his original patent in any way, went back to the patent office and secured a reissue in which he was permitted to broaden his first and second claims with respect to the kerfs and spurs so as to change the word "rigidly" used in the original claim to "permanently." Having done this, he

proceeded to sue in the second, third and sixth circuits persons using what he insisted were equivalents of his form of engagement in their column hooping reinforcement of concrete columns. All the courts, and there are six of them, have held these changed claims of the reissued patent to be void and to give him no right to claim infringement in the collapsible feature of the column hooping. The original specifications leave no doubt that the patentee used the word "rigidly" deliberately and properly because his truss, as he portrayed it, required rigid connection between the spiral loops and the main reinforcing bar. His making his form of engagement loose was an afterthought to catch makers who had not been advised in his specifications that there was anything collapsible in his truss formation. The reissue as to the first two claims was in the teeth of the admonitions of this Court speaking through Mr. Justice Bradley in *Miller* v. *Brass Co.*, 104 U. S. 350. They are therefore void.

Counsel for the patentee say now that the collapsible feature was only an incidental matter, and that what they now rely on is the combination under claims 3 and 5 of the reinforcing bar provided upon one edge with a series of kerfs each having an integral overlapping spur and a coil each convolution thereof being beneath one of the spurs. We do not think the respondent has this combination. We think the patentee's combination must be limited to a spiral with one bar in the truss formation, or at least one in which the spiral is free at one end and has no second support or spacer such as respondent uses. Patentee relies on Fig. 4 of his drawing and says that to add another spacer or bar is only the work of a mechanic; but he can not properly say so because Fig. 4 is only a detail of Fig. 1 of the drawings and was intended to be a lighter construction of the same beam with the same truss combination as shown in Fig. 1. Moreover, it is

perfectly obvious from the description and some of the claims that the spiral of Vandenburgh was intended to be free of all but the bar shown. This is made certain by Fig. 6 which is the only application of the device to column use shown and in that we have two bars standing upright each engaged with convolutions of a spiral, the loops of each spiral meshing with those of the other spiral but free of the other bar. It is clear to us that Vandenburgh having secured a patent for a truss form of reinforcement and finding it unworkable, for it never has been adopted in the trade or in any structure, is through reissue seeking to expand the paper combination he claims into a field in which it does not belong.

But it is insisted that Vandenburgh was the first to introduce into the field of concrete reinforcing the kerf and integral spur to clamp the spiral rod, that this involved invention, and that claim No. 3 should be construed to secure him a reward for this. It may be true that in the field of reinforcing concrete the kerf and spur had not been used before as Vandenburgh used it, but the kerf and spur were old in the art in kindred fields. They were old in metal working art. Exactly the equivalent is shown in sand screens for mixing the materials of concrete and in sustaining fence wires. It is difficult to differentiate the field of metal working from this art of reinforcing concrete because the problem was only one of spacing firmly the convolutions of the metal spiral and that was a well known device for such a need. We do not think the principle of *Potts* v. *Creager*, 155 U. S. 597, applies in this case. More than this in the very field itself, there was a prior German patent of Kieserling & Moller showing the use of the kerf for spacing a spiral in reinforcing concrete. It does not seem to us that it involved real invention merely to add a spur or clamp or to peen or hammer down the edges of the kerf so as to fix the spiral rod firmly. We find therefore that claims 3 and

5 were without merit as involving invention and that the action of the Circuit Court of Appeals should be

Affirmed.

CONCRETE STEEL COMPANY *v.* VANDENBURGH.

CERTIORARI TO THE CIRCUIT COURT OF APPEALS FOR THE SECOND CIRCUIT.

No. 238. Argued January 17, 1923.—Decided February 19, 1923.

Decided upon the grounds expressed in *Vandenburgh* v. *Truscon Steel Co., ante,* 6.
278 Fed. 607, reversed.

CERTIORARI to a decree of the Circuit Court of Appeals sustaining a patent and awarding damages for infringement.

Mr. Thomas J. Johnston, with whom *Mr. Lucius E. Varney* was on the brief, for petitioner.

Mr. O. Ellery Edwards and *Mr. Carlos P. Griffin,* with whom *Mr. Joseph W. Cox* was on the brief, for respondent.

Mr. Solicitor General Beck, Mr. Assistant Attorney General Lovett and *Mr. Melville D. Church,* by leave of court, filed a brief on behalf of the United States, as *amici curiae.*

MR. CHIEF JUSTICE TAFT delivered the opinion of the Court.

This is a review of the decree of the Circuit Court of Appeals of the Second Circuit sustaining the validity of claim No. 3 of the Vandenburgh patent, just considered in the previous case of *Vandenburgh* v. *Truscon Steel Co., ante,* 6, and awarding $15,000 for profits to Vandenburgh for defendant's infringement. The two cases can not be distinguished. We must, therefore, reverse

the decree of the Circuit Court of Appeals of the Second Circuit and direct the dismissal of the bill.

Reversed.